A Database Publication

electron user

Vol. 5 No. 1 October 1987 £1

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10 Liners
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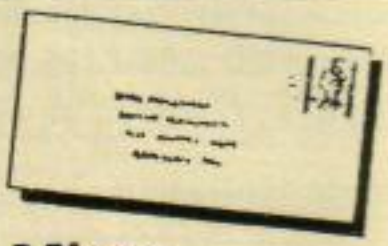

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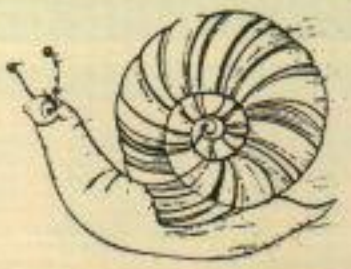

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Don't miss our special offers on Pages 50-53.

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Published by Database Publications Ltd
Europa House, 68 Chester Road, Hazel Grove, Stockport SK7 5NY.
Telephone: 061-456 8835 (Editorial) 061-456 8383 (Administration) 061-456 8500 (Advertising)
Subscriptions: 061-480 0171. Telecom Gold Mailbox: 72:MAG001. Prestel: 614568383.
Telex: 265871 MONREF G. Quoting Ref: 72:MAG001

ABC 37,575 January-June 1986

News trade distribution:
Diamond-Europress Sales and Distribution, Unit 1, Burgess Road, Ivyhouse Lane, Hastings, East Sussex TN35 4NR. Tel: 0424 430422.
Printed by Carlisle Web Offset.
Electron User is an independent publication. Acorn Computers Ltd, manufacturers of the Electron, are not responsible for any of the articles in this issue or for any of the opinions expressed.

Electron User welcomes program listings and articles for publication. Material should be typed or computer-printed, and preferably double-spaced. Program listings should be accompanied by cassette tape or disc. Please enclose a stamped, self-addressed envelope, otherwise the return of material cannot be guaranteed. Contributions accepted for publication will be on an all-rights basis.

Subscription rates for 12 issues, post free:

£12 UK
£20 Europe & Eire
£35 Overseas

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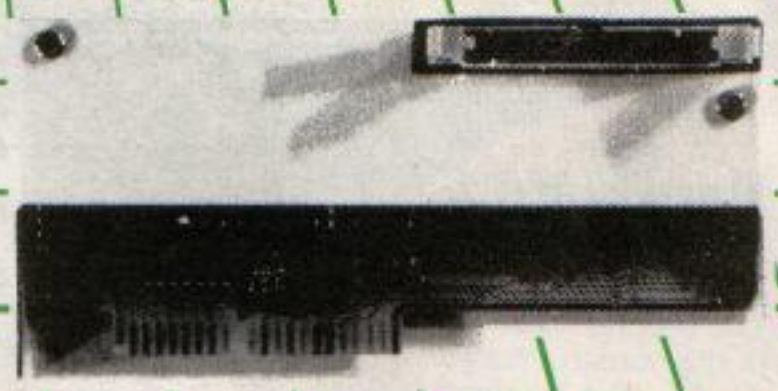
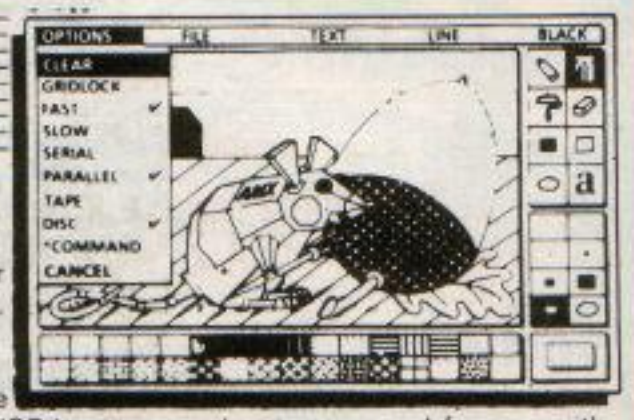


AMX MOUSE

POINTS THE WAY FOR THE ELECTRON USER



AMX MOUSE

Catch an incredible AMX MOUSE! The advanced opto-mechanical device that brings to your ELECTRON facilities once only available on more expensive computers. Now you can use ICONS, WINDOWS, AND POINTERS in your own programs.

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Plug the MOUSE into the user port, and the EPROM into your A.P.5. The latter contains fast machine code routines for creating on-screen windows, icons and pointers. And means that the MOUSE buttons can be programmed for use with commercial software such as Wordwise and View. There are two manuals included, explaining how to operate the MOUSE and the ROM routines, which are available in both basic and machine code programs.

Included in the package are two superb programs:

AMX ART has to be seen to be believed! It's a computer-aided drawing program that's just as good for serious applications - such as the preparation of detailed architectural and engineering drawings or teachers' worksheets - as it is for having lots of family fun! And if you're artistically inclined, you'll be astonished at the quality of work you can produce and save. It makes full use of on-screen menus, pull-down menus and icons: the ideal, easy way for novices to learn and gain in confidence.

ICON DESIGNER is an invaluable program for creating and storing icons for use in your OWN programs.

The ACP/AMX mouse package may be used on an ELECTRON fitted with a PLUS 1 & AP5. The 'ART' software is supplied on cassette but can be transferred to DISC (DFS not ADFS).

£69.95 – MOUSE PACKAGE AND AP5 £125.00

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"Looking at the A.P.5. shows it to be constructed to a high standard, it looks solid and robust. The A.P.5. Interface opens up the new Electron for a whole new type of computing." E.U. Dec '86

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The company responsible for marketing and distribution of Advanced Computer Products

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electron user NEWS

New at the Show

MORE innovative hardware and software for the Electron is being developed for unveiling at the 17th Electron & BBC Micro User Show to be held in November.

A number of new products have been promised for the machine, from new disc deals to music applications and utilities, though full specifications are not being released until nearer the date.

Exhibitors have been clamouring for space at the show, which runs at Royal Horticultural Hall, Westminster, London, from November 13 to 15, and almost all of the stands have now been taken.

A money-saving advance ticket order appears on page 53.

Electron gets Micro sound

A CARTRIDGE which enables the Electron to accept and play all the BBC Micro's sound commands will soon be on the market.

Project Expansions is putting the final touches to the cartridge – including giving it a name – which will sell for £39.95.

Project boss Chris Rudge said that Superior Software's Speech program had been made to work with the cartridge "after a small amount of modification".

Negotiations were now going on to see if an Electron version of the utility might be released.

The cartridge will come with demonstration music programs and spare ram.

Also on the cards from Project (0329 221109) is a utility rom which includes a very wide range of facilities, but which also has not yet reached the naming stage.

Rudge says that the rom has "a command for everybody".

It features defineable double-height characters which can be drawn on an 8x8 grid. Once complete the user is given a VDU command to call up the design. There is also a pattern and fill facility, which operates in similar fashion.

Other commands include *PLUS1 on/off; *LOCK on/off, and others for hex, binary and system specification.

It will cost £14.95.

Plus 3 upgrade

A DISC upgrade package for the Electron for less than £100 is being offered by PRES.

The distribution company has put a £99 price tag on the Advanced Plus 3, which will include a ready to roll disc system made up of an interface, filing system and 3.5in drive.

Boss John Huddleston of associated company ACP (0276 72046) described it as a major new product launch aimed at overcoming the price barrier for Electron users who wanted to upgrade to discs.

He said they had now finalised an agreement with Acorn to produce the Electron ADFS, which is run on the new product by a 1770 interface.

BEST OF BRITISH FOR THE US

A NEW transatlantic deal will see a British software house reverse recent trends by establishing a major presence in the United States.

Database Software has reached agreement on a joint venture with ShareData, pioneers of budget packages in the States and a public company valued at $28 million.

The end result is the formation of Database Software Inc. in Phoenix, Arizona.

The new corporation aims to market the best British and European titles through ShareData's 22,000 outlets in North America.

Database Software is part of the Database Group, the UK's leading publisher of computer magazines including Electron User.

As a software house, it first sprang to prominence in Britain in October, 1984, with the release of Mini Office – an Electron favourite.

Database Software is today recognised as one of the fastest growing companies in its field in the UK. The last 12 months have seen its turnover increase more than five times.

Similarly, ShareData in the States has a track record second to none. It has become the pacesetter for the American industry, recording sales of more than 500,000 units in the last three months.

Michael Meakin, joint managing director of Database, flew to Arizona to complete the British-American deal.

"We have spent a long time looking for a suitable partner in the States to make us a truly international company", he said, "and in ShareData we believe we have found the perfect answer.

"Now the search is on to find the hottest software properties in Europe and Britain to sell in America.

"It is a huge market with an insatiable thirst for good software. We intend to satisfy that demand with the help of the wealth of excellent software authors over here".

COMPETITION WENT LIKE A BOMB

A NATIONWIDE electronic mail competition offering a magnum of champagne as the star prize resulted in a giant hangover when the winner unwittingly caused the software in the central computer to crash.

When ex-San Francisco police officer Cameron (Cam) Lacey posted the 10,000th message on the MicroLink bulletin board from his office in Grimsby, all that should have happened was that he received a three litre bottle of Moet & Chandon to mark the milestone achievement.

Unfortunately what no one realised at that time was that the BBS system was only designed to cope with a data field of four characters – up to and including 9,999.

So when just one additional message was received, it was as if a giant fuse had blown.

When the crash came there was consternation at MicroLink headquarters. What made matters worse was that technical chief Tim Clarkson was on holiday and all attempts by his staff to revive Britain's biggest bulletin board were unsuccessful.

After two hours of frantic transatlantic telephone calls, the American authors of the bulletin board software finally traced the problem.

They were, however, unable to make the message numbering system accept a figure larger than 9,999. All they could do was make room by deleting the first 5,000 messages.

Cameron Lacey . . . ex-cop cops the big prize

In fact, the only person left with a grin on his face was Cameron Lacey.

Mind you, according to MicroLink boss Derek Meakin it should have been a sheepish one. For it seems that Cam cheated a little bit.

"He'd obviously written a program that started sending identical messages just as the number of messages on the board was approaching the 10,000 mark".

All the messages said was: "Is this the one?"

"So he ended up with the drink while we got left with the hangover".

Translation online

BRITISH computer users can now have access to what is claimed to be the biggest – and most up-to-date – multi-lingual dictionary in the world.

And it is already being viewed as a major breakthrough for groups as diverse as businessmen faced with foreign correspondence through to schoolchildren struggling with homework.

It is all part of a new service being offered by MicroLink, the UK's fastest growing electronic mail service.

Sitting at their keyboards, all subscribers have to do is type in a word or a complete phrase and the Great European Dictionary does the rest.

Housed in an EEC sponsored mainframe computer in Luxembourg, the electronic dictionary is the result of a massive collaboration between language experts throughout the community.

The Great European Dictionary consists of more than 380,000 words and phrases in English, German, Danish, Dutch, French, Italian, Portuguese and Spanish.

THE GALLUP CHART TOP 10

ELECTRON SOFTWARE

THIS MONTH	LAST MONTH	TITLE (Software House)	PRICE
1	1	AROUND THE WORLD IN 40 SCREENS *Superior*	6.95
2	2	PAPERBOY *Elite*	9.95
3	3	FOUR GREAT GAMES *Micro Value*	3.99
4	4	SUPERIOR COLLECTION VOL 2 *Superior*	9.95
5	9	CODENAME DROID *Superior*	9.95
6	6	FIVE STAR GAMES 2 *Beau Jolly*	9.95
7	•	STRYKER'S RUN *Superior*	9.95
8	5	FOOTBALL MANAGER *Addictive*	2.99
9	7	OLYMPIC SPECTACULAR *Alternative*	1.99
10	8	MICROPOWER MAGIC 2 *Micropower*	7.95

Compiled by Gallup/Microscope

Superior dominates the chart again this month holding first position with Around the World in 40 Screens in addition to the only new entry, Stryker's Run. Compilations are holding their own with three in the Top 10.

ACORNSOFT ELECTRON BONANZA

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VIEW ROM ~~£29.95~~ £14.95 (Word Processor)
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ACORN PLUS 1 ~~£59.95~~ £49.95 now in stock

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VIEW	£14.95
VIEW SHEET	£14.95
	~~£79.85~~

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PACKAGE 2

ELECTRON COMPUTER	£59.95
PLUS 1	£49.95
VIEW ROM	£14.95
	~~£124.85~~

OFFER PRICE **£99.95**

PRIMARY EDUCATION

Sentence Sequence*	~~£6.99~~
Word Sequence*	~~£6.99~~
Snapper	~~£6.99~~
Boxer	~~£6.99~~
Talk Back*	~~£6.99~~
Workshop*	~~£6.99~~

HOME INTEREST BUSINESS

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Desk Diary*	~~£6.99~~
Graphs & Charts*	~~£6.99~~
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*BBC Compatible

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Acornsoft Hits I & II
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MICROPOWER GAMES

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Croaker*	~~£7.95~~
Bumble Bee*	~~£7.95~~
Gauntlet	~~£7.95~~
Killer Gorilla*	~~£7.95~~
Rubble Trouble*	~~£7.95~~
Electron Invaders	~~£7.95~~
Felix Fruit Monsters	~~£7.95~~
Chess	~~£7.95~~
Danger UXB	~~£7.95~~
Frenzy	~~£7.95~~
Felix meets the Evil Weevils	~~£6.95~~
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Swoop*	~~£7.95~~
Jetpower Jack	~~£7.95~~
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Moonraider	~~£7.95~~
Bandits at 3 O'clock*	~~£6.95~~
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Escape from Moon Base*	~~£7.95~~
Ghouls*	~~£7.95~~
The Mine	~~£7.95~~

* BBC Compatible

NEW GAMES

Classic Adventures*

Gyroscope*

Dennis through the Drinking Glass*

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LISP Cartridge	~~£29.95~~ £9.95
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● *ANY FIVE FOR ONLY* ***£7.95***

EDUCATION SPECIALS

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Where?	~~£6.95~~
Biology	~~£12.65~~
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Which Salt	~~£6.95~~

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ELECTRON LANGUAGES

Lisp Cassette	~~£9.95~~ £2.95
Turtle Graphics Cassette	~~£9.95~~ £2.95
Forth Cassette	~~£7.95~~ £2.50

Electron Games Cartridges!!

Plus 1 Compatible

3 Games on one cartridge were ~~£19.95~~ each

Games Cartridge I contains:
Stockcar, Cybertron Mission, Bumble Bee **£14.95**

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Plus 3 Games Disc	~~£19.95~~	£9.95
Superior Collection Vol III (plus 3 disc)	~~£14.95~~	£11.95
Magic Mushrooms	~~£12.95~~	£2.95
Me and My Micro Book	~~£2.95~~	£1.00
Advanced User Guide	~~£9.95~~	£2.95

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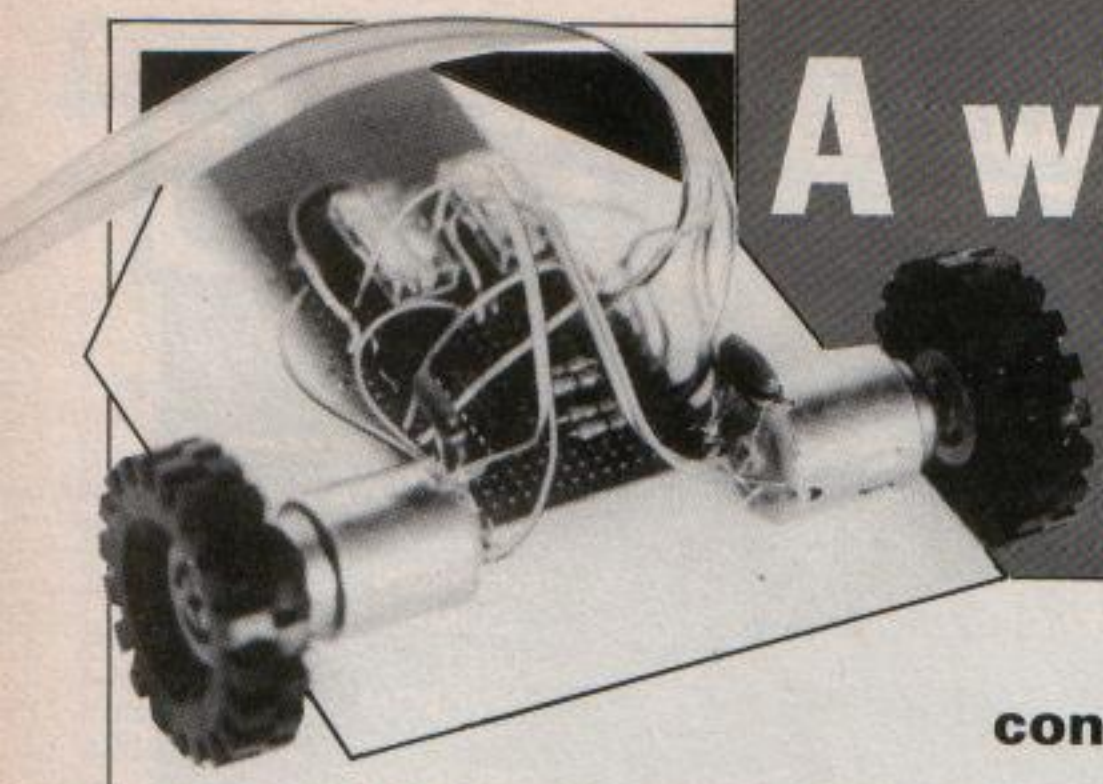

A wheely good add-on

JOE PRITCHARD continues his construction of the Electron buggy

WE saw in last month's article the electronic details of the Electron buggy. Now it's time to dust off our soldering irons and begin construction.

Although we need to drive two motors on the buggy, the control circuit is quite simple. Figure I shows a stripboard layout for the main circuit board.

It's slightly more complicated than the simple switching circuit we built in the August 1987 issue of *Electron User*, but construction is still quite straightforward.

We'll need a piece of 0.1 inch matrix stripboard 35 rows high by at least 45 holes deep. We won't use all the rows available at the moment, but a piece of board this size will leave space to add more circuitry in future.

The first stage of the construction process is to use a spot face cutting tool or a drill bit to cut away the copper at the points marked in Figure I.

The spot face cutter is a very useful tool, simply rest the point in a hole on the copper side of the track, and twist it a couple of times. The result is a round hole in the track.

At each point we need to totally sever the copper, taking care not to break or go through the board. Laying the board copper side up on the workbench will help.

A cut track should look like Figure II. Make sure there are no thin wisps of copper linking the two parts of the track. Double check each break, with a circuit tester if you have one, to ensure it's clean.

The next stage is to solder all the wire links into the board using insulated copper wire. It's a good idea to solder these in first to cut down the risk of heat damage to expensive components like the darlington driver.

Take care to fit the links in the correct places, and check all of your soldered joints to make sure you don't bridge two or more tracks.

0.1 inch Veropins should be used where marked. These are metal pins that are inserted into the board and soldered in. Wires can then be twisted round the pin and soldered, as shown in Figure III.

A pin insertion tool is quite useful for siting Veropins though they can be pushed into the board with a pair of pliers.

For all of the on board

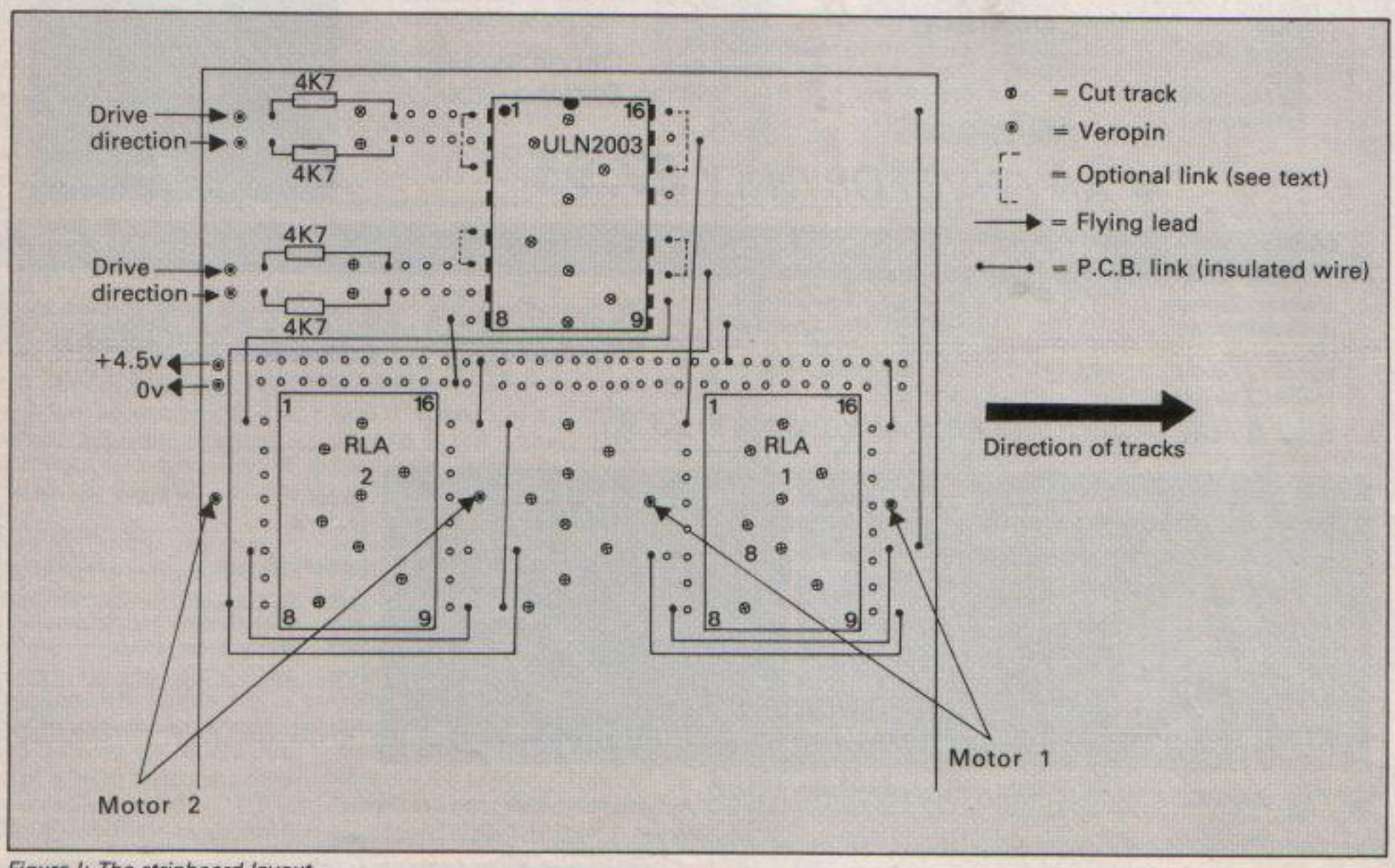

Figure I: The stripboard layout

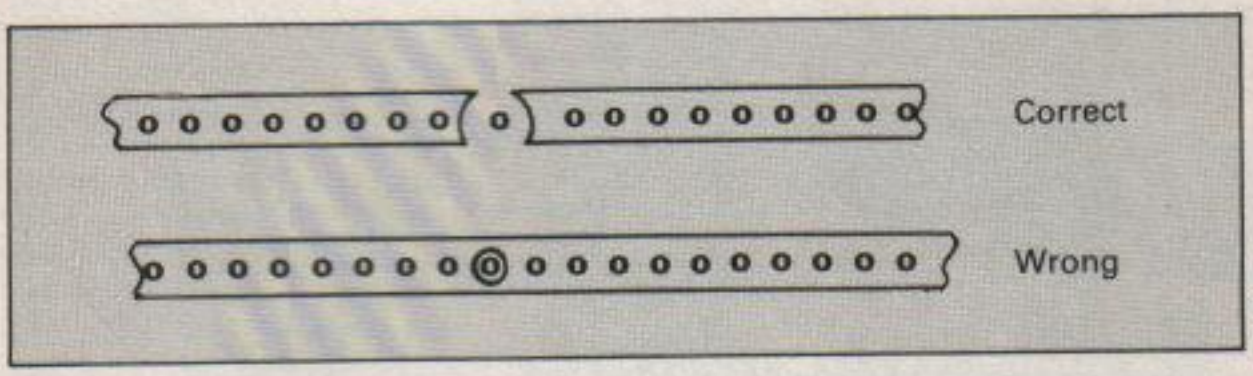

Figure II: Making certain that the tracks are cut

connections, the wires can be soldered directly to the tracks, but the pins offer more strength. Eight core ribbon cable should be used for the connections to the user port and the power supply.

We now come to the first of the electronic components – the four resistors. These shouldn't cause any problems, but don't bend their leads too close to their bodies, as this can sometimes cause them to snap off. Whenever possible, bend them at right angles to the body of the component.

The relays and darlington driver chip are very delicate and should be treated with extreme care while soldering as they can be damaged by heat.

It is, in fact, preferable to use sockets to hold these components. Three 16 pin dual in line (DIL) sockets are needed. One for the driver chip and one each for the relays which, although they only have 8 pins each will fit neatly into a 16 pin socket.

If you decide to solder the parts in direct, don't spend too long soldering the joints, and allow the component to cool down after making each one. Be especially careful not to splash solder between the pins of the darlington driver chip.

You should now have a board that's ready to connect up to the motors and power supply for testing. However, before we do that it's a good idea to check your connections to make sure all is well.

As shown in Figure IV, connect up the motors to the relevant wires, and connect a 47nf ceramic capacitor across the terminals of each to supress radio interference.

The 4.5V supply for the circuit can be derived from three 1.5V cells connected in series or a 4.5V torch battery.

Temporarily connect up the supply to the board. With no connections to the motor control lines, nothing should happen. Now put a finger on the darlington chip, it should be cool. If not, check the wiring.

Next, take the direction input for motor one to 4.5V. You should hear a click as the relay closes. If not, check the wiring, especially to pins 1, 2, 15 and 16 of the darlington driver and to relay one.

If this works, connect the direction input of motor one to 0V and take the direction line of motor two to 4.5V and again listen for relay two to click.

You should be able to see the relay move. If this doesn't work, check pins 6, 7, 10 and 11 of the darlington driver chip and the connections to relay two.

Leave both direction lines connected to 0V and connect the drive lines of each motor to 4.5V. Both motors should run in the same direction. If one runs in reverse, exchange the connections to it.

We're now ready to put the whole thing together. Assembly instructions are shown in Figure V. The base

Turn to Page 10 ▶

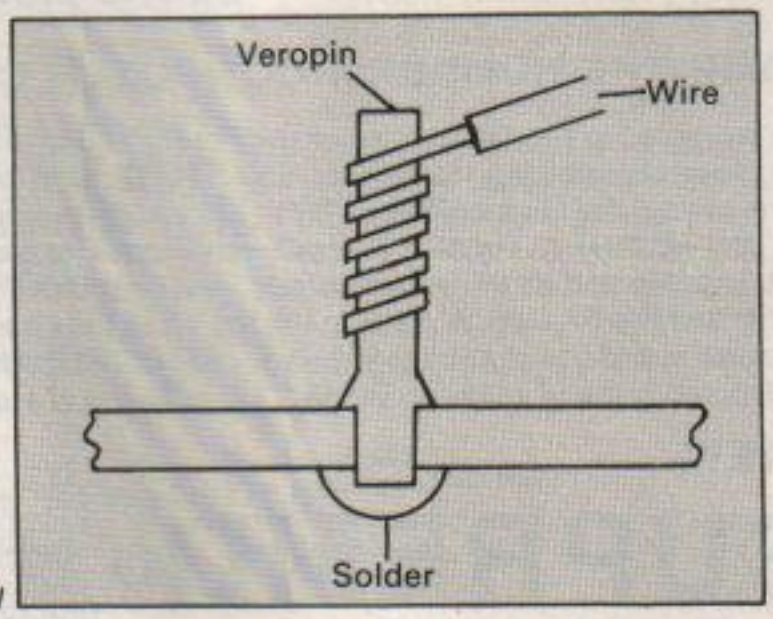

Figure III

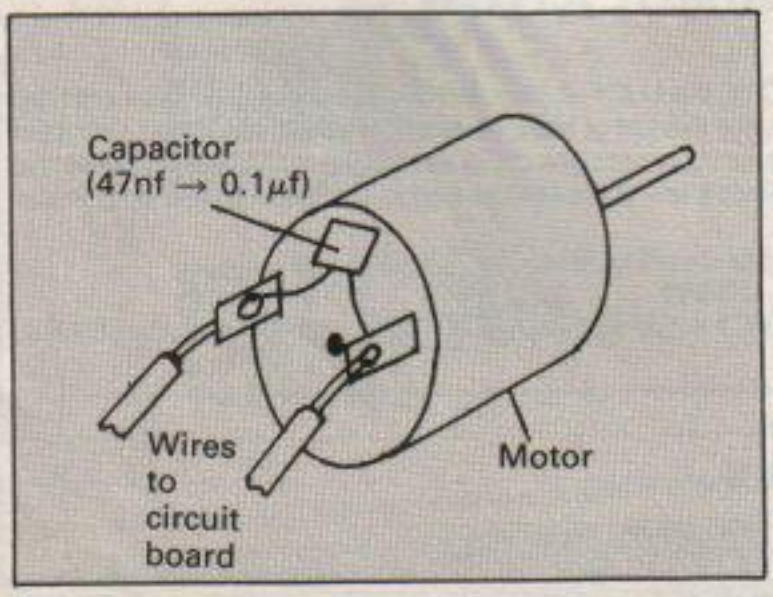

Figure IV

MOTOR PROBLEMS

I HAVE discovered that some low cost motors are not powerful enough to move the buggy. They simply don't have enough torque (turning force) to pull their own weight plus the buggy's across the floor.

To check your motors out, temporarily fix them in the correct position on the base plate and see if you can get the buggy to go forward and backward by connecting the drive inputs to 4.5V and 0V alternately.

If the buggy moves (and it might move quite quickly) your motors are fine. If it doesn't move, or judders, you may need motors with more pull. Two you can try are:

*● **Technical Lego motors**. These are available in kits from toy shops and include wheels, although they can be expensive.*

*● **Rapid Electronics High Torque motors**, from Rapid Electronics, Hill Farm Industrial Estate, Boxted, Colchester, Essex, CO4 5RD.*

Although both these motors can be used with great success, they take more current than a single darlington driver can handle. In order to protect the chip it is necessary to connect two drivers in parallel for each motor, thus halving the current that each has to cope with.

This is easily done, because in the package there are some spare drivers. On the darlington driver chip connect pin 1 to pin 3 and pin 5 to pin 6. Then, connect pin 14 to 16 and pin 11 to 12.

These connections are shown dotted in the stripboard layout diagram, Figure I.

Hardware Projects

◀ *From Page 9*

plate is 1mm thick plastic card, which is available in A4 sheets from most model shops.

The wheels came from a Technical Lego set and were glued to the motor shafts with epoxy resin, though any wheels from toys or models could be used as an alternative.

The tail wheel, preventing the buggy dragging it's rear end on the ground can be made from a sawn up ball point pen cap and epoxied on to the base plate, the rounded end resting on the ground. The motors can also be epoxied onto the base plate.

Double sided adhesive pads fix the circuit board between the two motors. At a later date we'll be adding extra circuits to our buggy and we'll need to make connections to this board. The pads will hold it firmly but will allow it to be removed when necessary.

That completes construction. We'll be running the buggy using the VIA terminal box I described in the July 1987 issue of *Electron User* so you'd better prepare it for next time.

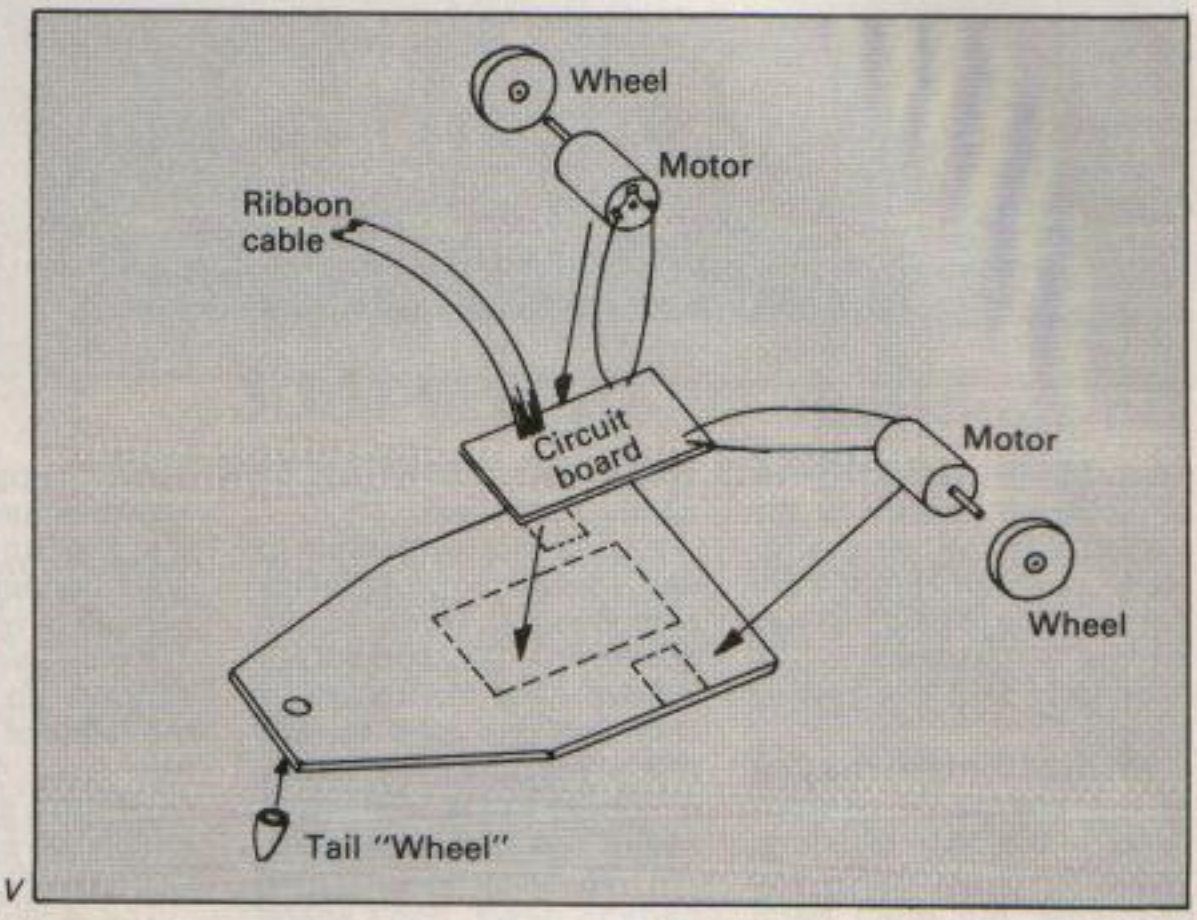

Figure V

● *Next month we'll complete the buggy with some programming and introduce the VIA's timer registers.*

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THE NEW

TAPE 1
6 Seasons
League Division 1
The F.A. Cup

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A SOCCER MANAGEMENT SIMULATION

TAPE 2
European Cup
U.E.F.A. Cup
Cup Winners Cup

To the original version of SOCCER SUPREMO we've added; the F.A. Cup, the European Cup, the U.E.F.A.Cup and the European Cup Winners Cup. We've introduced multiple DATA files for the different seasons and to allow a massive transfer market of over seventy players, from World Cup stars to top scoring non-league players, we've retained the 3D, 22 man, 90 minute football match graphics, improving the graphics' layout, We've added sound, in-match injuries, named goal scorers, penalty shoot-outs (European matches), and replaced the complicated match statistics with a post match individual player assessment. We've . . . . . well, lots of other small improvements.
The game is now almost three times the size of the original, using two tapes plus the multiple datafiles. But . . . . . .

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The new SOCCER SUPREMO is supplied DIRECT from Qual-Soft on a same day basis. TAPE 1 + TAPE 2 + MANUAL, P&P and VAT still costs **£9.95.** Payment by cheque, PO or Access authorisation, made payable to Qualsoft.

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Dept. EU,
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Tel: 0438 721936

Please supply:
SOCCER SUPREMO
for my Electron

Name:
Address:
Access No. (if applicable)

Sticky line in utilities

IAN BROWN presents a label printer for View

AS a word processor, View is excellent for creating documents, reports and even editing Basic programs. What it lacks however, is a label printing facility.

This utility extends the capabilities of View by adding a simple database tailored to producing address labels.

The addresses are entered as a normal View file and saved to disc or tape as usual. To enable the program to recognise the start and end of each address, the little used CO stored command is used as a delimiter.

This allows comments to be inserted into a View document and is rather like Basic's REM statement. The text above or below the COs is not printed out by the label printer.

To use the program it is first necessary to create an address file using View. On the line immediately above and below each address put a CO into the stored command margin, as shown in Figure I.

As any text outside the CO delimeters surrounding each address is ignored, the file need not specifically be an address list as Figure II demonstrates. Don't forget to save your work before returning to Basic.

Now load and run the label printer. A menu will appear with a message telling you that you have no addresses loaded. Press 1 to load the View file.

When prompted, either enter the name of the file or just Return if the file is called ADDLIST, the default name.

If you are using tape, rewind it to where the View file starts, and press Play. Note that the cassette recorder must have motor control for the program to work properly.

To display the addresses in memory, select option 3 from the menu. You will be given the option of dumping everything to printer.

This is not the label printing routine, but simply gives you a complete list of addresses with an index number preceding each one.

The label printing routine is selected by entering option 2. When asked which address to print you can type in either the index number of the address required or part of the first line of the address.

For example, the third address in Figure I could be selected by entering Barry, Wood or even Barry Wo but not BARRY since the search is case sensitive.

The chosen address will be displayed on the screen. You will then be prompted which type styles you wish to use. The codes provided are suitable for most Epson compatible printers.

Finally the label is then printed out. Further labels can be printed by reselecting option 2 from the menu.

As written, the program will accept a file of up to 50 addresses of up to 10 lines each.

If your printer is not Epson-compatible, or you require different print options, you can alter the printer control codes in lines 820 to 950.

```
FJ .....*.....*.....*.....*.....*.<
CO
   Dr M. D. Procter,
   40 Green Meadow Road,
   North Shields,
   Tyne and Wear.
   TW10 4KS
CO
CO
   Electron User.
   Europa House,
   68 Chester Road,
   Hazel Grove,
   STOCKPORT,
   Cheshire.
   SK7 5NY
CO
CO
   Barry Wood.
   Oak Cottage,
   South Woodham,
   Langbaugh,
   Cleveland.
   TS11 4BJ
CO

**********************************************
```

Figure I: A sample address list

Turn to Page 12 ▶

◀ From Page 11

```
  10 REM Label printer
  20 REM by Ian M. Brown
  30 REM (c) Electron User.
  40 :
  50 MODE 6
  60 PROCinit
  70 REPEAT
  80 PROCmenu
  90 UNTIL end=TRUE
 100 PROCend
 110 END
 120 :
 130 DEF PROCinit
 140 end=FALSE
 150 *OPT 1,1
 160 n%=0
 170 maxn%=50
 180 DIM ad$(maxn%,10)
 190 DIM adno%(maxn%)
 200 ENDPROC
 210 :
 220 DEF PROCmenu
 230 VDU 23,1,0;0;0;0;
 240 CLS
 250 PRINTTAB(13,2)"LABEL P
RINTER"
 260 PRINT'TAB(14);n%;" add
resses""
 270 RESTORE 420
 280 FOR c%=1 TO 3
 290 READ c$
 300 PRINT'c%;" "c$
 310 NEXT
 320 PRINT'0;" Quit"
 330 PRINTTAB(13,24)"Enter
choice:";
 340 REPEAT key$=GET$
 350 UNTIL INSTR("1230",key
$)
 360 IF key$="1" AND n%<max
n% PROCload
 370 IF key$="2" AND n%>0 P
ROClabel
 380 IF key$="3" AND n%>0 P
ROCdisplay
 390 IF key$="0" IF FNcheck
 end=TRUE
 400 ENDPROC
 410 :
 420 DATA Load addresses,Pr
int label,Display addresses
 430 :
 440 DEF FNcheck
 450 VDU 23,1,1;0;0;0;
 460 PRINTTAB(8,24)"Confirm
 choice "key$" (Y/N): ";
 470 =FNyn
 480 :
 490 DEF FNyn
 500 REPEAT k$=GET$
 510 UNTIL INSTR("YyNn",k$)
 520 PRINT k$
 530 =INSTR("Yy",k$)
 540 :
 550 DEF PROCdisplay
 560 CLS
 570 PRINTTAB(11,2)"Display
 addresses""
 580 PRINT"To printer (Y/N)
?";
 590 IF FNyn VDU 2
 600 VDU 14
 610 FOR k%=1 TO n%
 620 PRINT"Address ";k%'
 630 FOR c%=1 TO adno%(k%)
 640 PRINT ad$(k%,c%)
 650 NEXT
 660 NEXT
 670 VDU 3
 680 VDU 15
 690 PRINT'TAB(14)"Press s
pace'
 700 REPEAT UNTIL GET=32
 710 ENDPROC
 720 :
 730 DEF PROClabel
 740 CLS
 750 PRINTTAB(14,2)"Print l
abel""
 760 IF n%>1 PROCchoose ELS
E m%=1
 770 PRINT
 780 FOR k%=1 TO adno%(m%)
 790 PRINT ad$(m%,k%)
 800 NEXT
 810 PRINT'"Enter print opt
ions:"
 820 VDU 2,1,27,1,ASC"@":RE
M  Default all settings
 830 VDU 1,27,1,ASC"R",1,3,
3:REM  Set 'England I' chara
cter set
 840 PRINT'"NLQ (Y/N)? ";
 850 IF FNyn VDU 2,1,27,1,A
SC"I",1,3,3:GOTO 940
 860 PRINT'"Condensed (Y/N)?
 ";
 870 IF FNyn VDU 2,1,15,3
 880 PRINT'"Elite (Y/N)? ";
 890 IF FNyn VDU 2,1,27,1,A
SC"M",3 ELSE VDU 2,1,27,1,AS
C"P",3
 900 PRINT'"Double-strike (Y
/N)? ";
 910 IF FNyn VDU 2,1,27,1,A
SC"G",3
 920 PRINT'"Emphasized (Y/N)
? ";
 930 IF FNyn VDU 2,1,27,1,A
SC"E",3
 940 PRINT'"Enlarged (Y/N)?
";
 950 IF FNyn VDU 2,1,27,1,A
SC"W",1,1,3
 960 PRINT'"Margin (Y/N)? ";
 970 tab=FNyn
 980 PRINT'"Press 'Y' to pr
int or 'N' to quit: ";
 990 IF FNyn=0 ENDPROC
1000 PRINT''
1010 VDU 2
1020 PRINT
1030 FOR c%=1 TO adno%(m%)
1040 IF tab VDU 1,9
1050 PRINT ad$(m%,c%)
1060 NEXT
1070 PRINT''
1080 VDU 1,27,1,ASC"<"
1090 VDU 3
1100 PRINT'"TAB(14)"Press s
pace"
1110 REPEAT UNTIL GET=32
1120 ENDPROC
1130 :
1140 DEF PROCchoose
1150 REPEAT
1160 INPUT'"Which address? "
m$
1170 IF STR$(EVAL("0"+m$))=
m$ m%=EVAL(m$):GOTO 1210
1180 m%=0
1190 REPEAT m%=m%+1
1200 UNTIL INSTR(ad$(m%,1),
m$) OR m%>n%
1210 UNTIL m%>0 AND m%<=n%
1220 ENDPROC
1230 :
1240 DEF FNfound
1250 C%=BGET #A:IF C%<>&80
=FALSE
1260 C%=BGET #A:IF C%<>&43
=FALSE
1270 C%=BGET #A:IF C%<>&4F
=FALSE
1280 C%=BGET #A:IF C%<>&0D
=FALSE
1290 =TRUE
1300 :
1310 DEF PROCload
1320 CLS
1330 VDU 23,1,1;0;0;0;
1340 PRINTTAB(15,2)"Load fi
le""
1350 INPUT"Name of file: "f
ile$'
1360 IF file$="" file$="ADD
LIST":VDU 11,11:PRINT"Name o
f file: ADDLIST"
1370 A=OPENIN(file$)
1380 REPEAT
1390 REPEAT
1400 UNTIL FNfound OR EOF #
A
1410 IF EOF #A GOTO 1550
1420 n%=n%+1:line=0
1430 PRINTTAB(0,10)"Address
es found ";n%
1440 SOUND 1,-1,120,2
1450 C%=BGET #A
1460 REPEAT
1470 line=line+1
1480 ad$(n%,line)=""
1490 REPEAT
1500 IF C%>31 AND C%<127 ad
$(n%,line)=ad$(n%,line)+CHR$
(C%)
1510 C%=BGET #A
1520 UNTIL C%=&0D
1530 UNTIL FNfound OR EOF #
A
1540 adno%(n%)=line
1550 UNTIL EOF #A OR n%=max
n%
1560 CLOSE #A
1570 ENDPROC
```

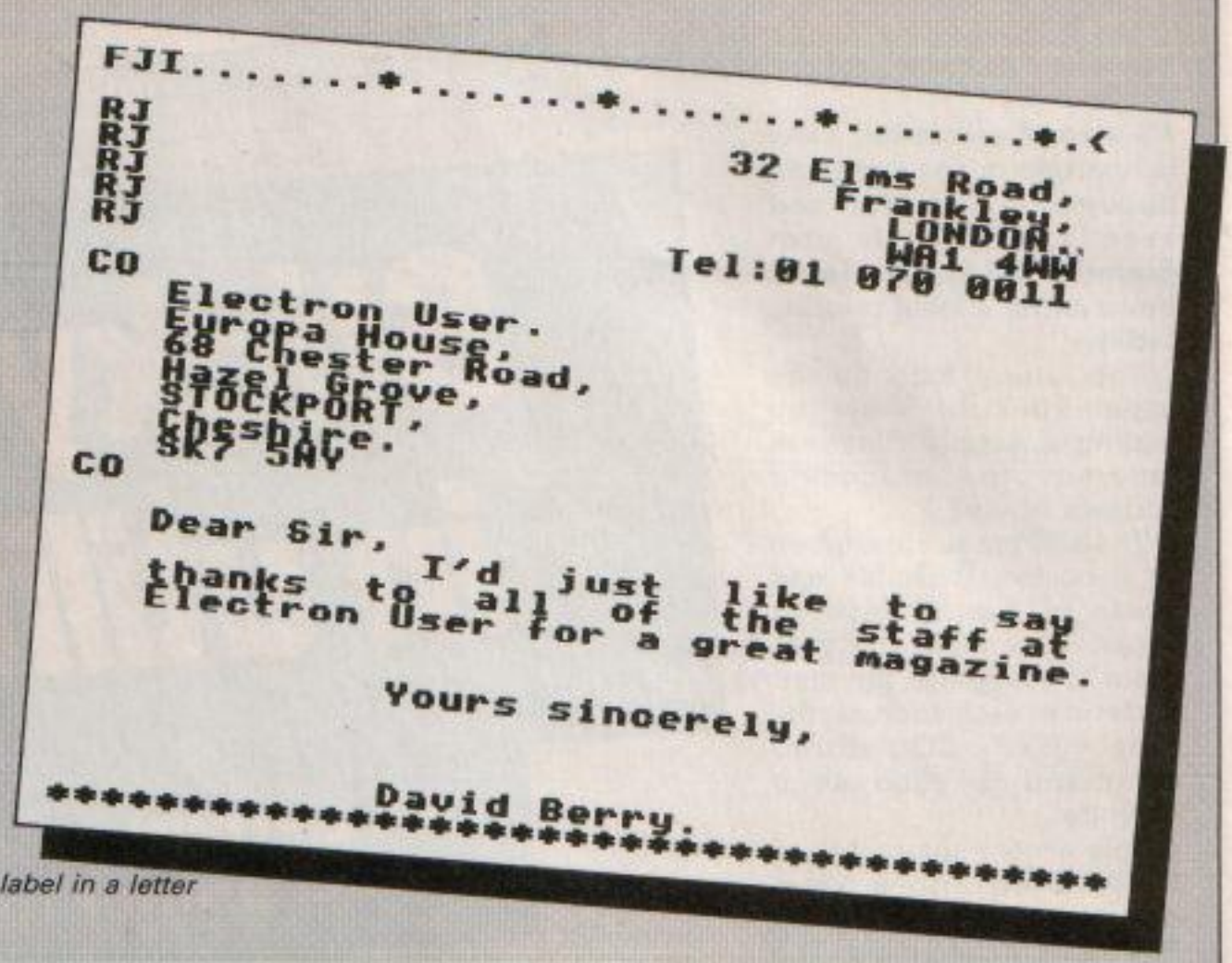

Figure II: Including a label in a letter

This is one of hundreds of programs available FREE for downloading on

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This listing is included in this month's cassette tape offer. See order form on Page 53.

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An action close-up

Enemy equipment (Enhanced BBC Master version)

A camouflaged Battle fortress (Enhanced BBC Master version)

STRYKER'S RUN for the BBC Micro B, B+, Master, Master Compact, and Acorn Electron

Stryker's Run features probably the best graphics ever seen on the BBC Micro or Acorn Electron; the action is intense and the animation is superlative.

The battlefield graphics include cities, edifices, wrecked buildings, trees, gravestones, bridges, despatch-posts, military bases, helicopters and jet ships, with hills and mountains in the background. The Master-enhanced version also includes statues, watch-towers, a neglected cafe, a deserted cinema, aircraft hangars, aeroplanes, trucks and tanks.

For many years, a war has ensued between the Allied Nations and the Volgans. The battle was reaching a stalemate position, but recently the Allies through good intelligence work and some luck have managed to obtain the plans of the Volgan's next offensive. If the Allied Forces can capitalise on these plans they can end the impasse and the war. You play the role of Commander John Stryker commissioned to take this top-secret information to the Allies' HQ.

Your character in the game can jump, run, duck, fire his laser pistol and throw grenades. He can also board aircraft and fly them, making use of their more powerful weaponry.

Your opponents, the Volgans, have a variety of weapons at their disposal comprising rifles, pistols, grenades, machine-guns, mortars, mines, helicopter gunships, rocket launchers and SAM missiles.

Stryker's Run is one of our most successful releases ever. It has topped the BBC Micro software charts for six weeks and received several glowing reviews: *"The graphics are stunning . . . This should be in every collection"* enthused A & B Computing.

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Stryker's Run is the first release to include a specially enhanced version for the BBC Master making use of its 128K of RAM.

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The screen pictures show the BBC Micro version of the game.
The graphics of other versions may vary.

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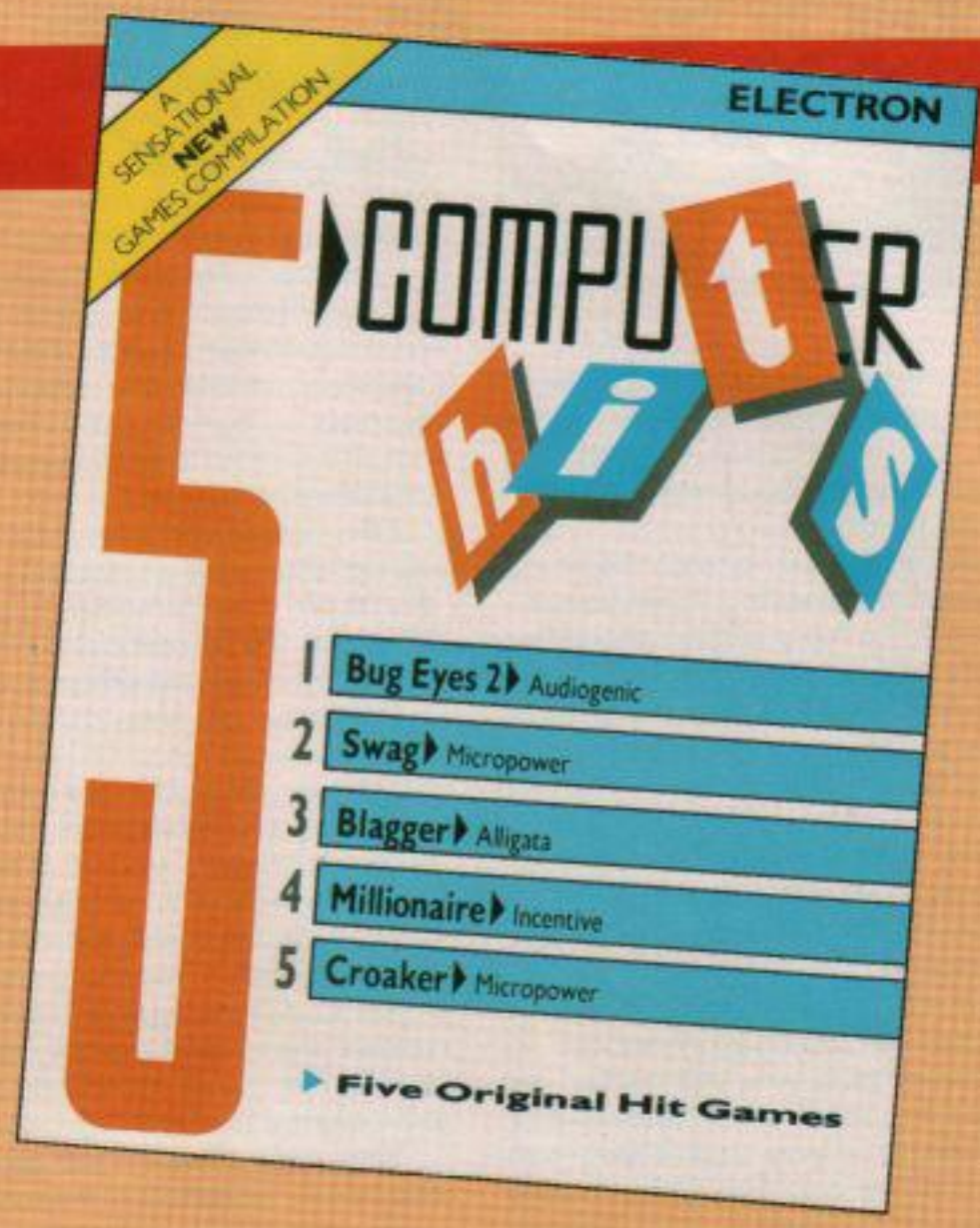
Golden oldies



Program: 5 Computer Hits
Price: £6.95
Supplier: Beau-Jolly, 29a Bell Street, Reigate, Surrey RH2 7AD.
Tel: 0737 222003

CROAKER heads this compilation tape of five golden oldies and is similar to Frogger, seen in the arcades many years ago.

Your aim is to dodge the traffic while crossing a busy road, then use floating logs and turtles as stepping stones to cross a river. Unfortunately for you, you're the only frog that can't swim.

Later, screens become more difficult as hungry crocodiles float past, and the turtles dive now and then. The graphics are well drawn, with smooth character movement. And although the sound may become a little monotonous it can be switched off.

The next game is Blagger, which is a variation on the platforms and ladders theme featuring a burglar called Roger the Dodger. With him you steal your way through 20 screens.

Most of the obstacles don't fit in with the scenario and are there simply to add spice: Conveyor belts and disappearing platforms are fine, but spaceships and railway engines are hard to explain, while giant mouths with gnashing teeth, although graphically effective, do not normally pursue even the most villainous criminal.

The sound effects are basic, with the movement not always realistic, resulting in Roger staying in the air for so long Rudolf Nuryev would be green with envy.

Swag is next, another game for budding burglers. You must collect £250,000 in diamonds before your opponent, all the while dodging bullets and killer droids.

The screen shows two houses where you and your opponent hide your ill-gotten gains, and also the bank where a deposit of gold will finance a further supply of bullets.

Police cars interfere with your progress, but can be stopped after a drink that refreshes parts others can't reach, and shooting at their car.

The graphics are excellent, the sound is good and the action is very fast. For my money this is the best game on the tape.

Millionaire is a simulation game where you are head of a software company and must make the necessary decisions on marketing policy, including whether to trade with Honest Harry.

The program is virtually all text, graphics being limited to a picture of the type of office you occupy, starting from a terraced house.

The questions posed are reasonably representative of the sort of decisions made in business, but too much depends on luck.

The last item is Bug Eyes 2, a multi-screen sequel to Space Agent Zelda Meets the Bug Eyes.

In the original game, Zelda took on the might of the Xxabaneans and was captured. Your job is to search their flagship and find the 25 keys to release her while avoiding the nasties ranged against you.

Sound quality is good with the graphics composed of smoothly moving chunky sprites. I especially liked the way that as you exit each screen, one of Sir Clive's C5s is waiting for you.

I rate Bug Eyes 2 and Swag as the best on this compilation and if you have neither of these it becomes excellent value. The other games tend to be a little dated and I would not buy it for them alone but they are worth having to build up your collection.

Beejay

Sound	6
Graphics	7
Playability	7
Value	8
Overall	7

No strings attached

Program: The Puppet Man
Price: £3.95 (mail order only)
Supplier: Larsoft, 4 Chantry Road, Clifton, Bristol BS8 2QD.

GEOFF Larsen is fast becoming one of the prime adventure writers for the Electron. With the release of this, his fifth adventure, he confirms his mastery of the genre.

The Puppet Man is one of the most original and engrossing adventures I have seen for a long while, and must be Geoff's finest offering yet.

At the end of the last century there lived a puppeteer whose puppet plays were the talk of the land. In fact his puppets were so lifelike it was rumoured they were little people, made up to look like puppets.

At the midsummer fair in the village of Owlsmore the Puppet Man is due to perform, but the day before, his star marionette was stolen or mislaid.

During a dream you are visited by Mnemosyne, mother of the Greek muses. She tells you that if you can help three of her daughters, the muses of dance, comedy and poetry, they in turn will assist you in a search for the marionette.

The adventure becomes a trilogy of inter-related plots in which you first help a ballerina, then an auguste clown and finally Pierrot.

The backdrops incorporate 19th century theatre and circus giving the whole adventure the heady atmosphere of vaudeville. The puzzles are complex, but totally logical and require careful thinking and revisiting of different scenes.

The beginning reminds me of something of a cross between Level 9's Worm in Paradise and Robico's Myorem. To be compared even in part to those two masterpieces is sure testimony to the quality of this adventure.

Later on there is a beautiful scenario involving a butcher, a baker and a candlestick maker, and a wooden tub. Another scene involves trapping a bear, while on the stage is a struggling Covent Garden escapologist.

As suggested, the adventure involves dancing, comedy, poetry and sleight of hand, and like all Larsoft adventures is totally non-violent.

The multi-use of each location and the facility to talk to the characters you meet, means Geoff has used the Quill to its utmost. The mind boggles to think of what he might achieve given machine code programming and

better text compression.

This adventure really is superb and you will be hard pressed to find a better release for the price. Larsoft is going to be a name worth watching, over the next few years.

All I can say is, buy it, you won't be disappointed.

Pendragon

Presentation	9
Atmosphere	8
Frustration Factor	9
Value for money	10
Overall	9

Spritely character

Program: Ziggy
Price: £7.95
Supplier: Audiogenic, 12 Chiltern Enterprise Centre, Station Road, Theale, Berkshire RG7 4AA.
Tel: 0734 303663

ZIGGY is the unlikely new star from Audiogenic, being a rather strange thing on a spring bouncing its way round the screen.

The game is, I suspect, the first in a run of 3D arcade adventures, which up until now have never been seen on the Electron.

The screen display is laid out in a style known as oblique projection, where horizontal lines are rotated 45 degrees to the horizontal. You can see a flat board with squares marked out and your viewpoint is from above and slightly behind, looking down at an angle.

Once you've got used to the unusual perspective you can start to guide Ziggy round the board.

It all starts off in fine style, with the thing on a spring bouncing merrily around level zero collecting assorted crystals left lying around, one in each of the four rooms. At this early stage it takes little thought to collect all four jewels.

Now you bounce on to a special square which takes you up to the next level. Complete this and move to the next. Up to level four the game is straightforward enough, but after that things start to get hectic.

Patches of sticky glue and deadly skulls start to get in the way of the little guy and he has to increase his bounce speed and distance to leap over them.

All of this excess effort drains his life force at an alarming rate and if he keeps it up for too long, it's curtains.

Ziggy is not very spectacular graphically. Although the characters are nice and chunky, the playing area is in two colour Mode 4, and even though these vary from level to level, the effect is rather drab.

The animation is a bit jerky at times and the key response can be sluggish. This is a pity, because it detracts from

what essentially is a very enjoyable game – and original too.

One feature I was pleased to see was a screen designer, so even if you can't complete the 200 rooms supplied you can at least define your own.

And just for a change, there's a natty little tune that won't drive you round the bend because you can turn it off.

Ziggy is the type of game you'll either love or hate and has got to qualify as one of the trickiest yet. So I strongly recommend that you try it before you buy it.

Julia Forester

Sound	7
Graphics	5
Playability	7
Value for money	6
Overall	6

Superb trilogy

Program: Saga of a Spy (The Rick Hanson Trilogy)
Price: £23.95 (cassette)
Supplier: Robico Software, 3 Fairland Close, Llantrisant, Mid Glamorgan CF7 8QH.
Tel: 0443 227354

REGULAR readers will know I have long been an admirer of all Robico adventures and have played each of the Rick Hanson trilogy beyond exhaustion.

Rick Hanson, Project Thesius and Myorem, which make up the trinity, have been released individually during the past two years.

This package not only bundles the three games together with other goodies like a Robico pen, hint sheets and an adventurer's notebook but also offers a £5 saving on buying the games separately.

The accompanying documentation reveals the development of the Robico parser and adventure writing system and sets the scene for each adventure for those who are uninitiated to this super spy.

This 600 location marathon begins logically enough, with Rick Hanson – formerly titled The Assassin. As Rick Hanson, agent extraordinaire, you find yourself in a disused railway station at the start of another secret mission. What it entails, you don't know, but you soon find out, unless an enemy's bullet gets you first.

The red seat cover and bull scenario has now become a classic stumbling block for nearly all who have played this game.

In Project Thesius, you have been chosen to investigate enemy development in particle beam technology which threatens world security.

You begin your mission on a sandy beach, and your first task is to dry yourself and avoid the scrutiny of an enemy helicopter. I defy anyone to solve the Witherton village maze at the first attempt.

Myorem is the third and most highly developed of the adventures, and for sheer complexity is my favourite. Tied, gagged and bound to a post in a dusty arena with a firing squad about to send you to your maker, you have only your thoughts to secure your survival.

And of all the marvellous puzzles you will be hard pressed to find one more enjoyable than the wooden hut problem.

There are a number of mazes, but each is quite individual in style and require careful mapping, though the mountains in Myorem require different technique.

Layered atmosphere and humour make offerings from most other companies pale in comparison. There are also literally dozens of exquisite chaining puzzles to think out and solve.

At £23.95 this isn't cheap, but after all, you're getting three of the best adventures available for the Electron.

Pendragon

Presentation	*10*
Atmosphere	*10*
Frustration factor	*10*
Value for money	*8*
Overall	*10*

Cheap and cheerful

*Program: Crazy Er*bert*
Price: £1.99
Supplier: Alternative Software, Units 3-6 Bailey Gate Industrial Estate, Pontefract, West Yorkshire, WF8 2LN.
Tel: 0977 797777

CRAZY Erbert is a cuddly looking little character who plays the hero in this 3D Pacman type game. Living in a world made up of interconnected cubes, his simple aim is to visit each one and paint its top surface a different colour.

He treats his cubes as stairways and travels diagonally up or down. Four keys are needed to steer him and these take a bit of getting used to.

At the start of the game you can select from 10 levels of difficulty and whether the movement should be fast or slow. I find the slow option is quite fast enough for me.

It's an old gripe, but what a pity there is no sound on/off option. The sound effects are nice, but many games players have a need for silence at times.

Erbert does not live alone and the other occupants of his world are all enemies. He is persistently chased by two well-drawn large and colourful characters, Coily Snake and Boris Gorilla. If they catch him one of his three lives is lost.

He can escape from his pursuers by using the two elevators at the edge of the screen – these return him to the top block.

If Boris or Coily try to follow, they vanish for a few vital seconds. This not only gives a chance for safe movement, but also some bonus points.

Erbert can also collect a Rota Hat which allows him a limited flight. Two extra keys are required to manage the flying skills. Elevators and rota hats can only be used once.

To add to the problems, some unseen giant is rolling boulders down the cubes. If higher skill levels are chosen, some of the cubes convert themselves into vaporisers. These have an detrimental effect on Erbert's life expectancy, but they don't last too long themselves.

Also at the higher levels, Erbert can't paint the cubes in one go. He applies an undercoat on the first visit

and requires a second to apply the top coat. If you wish to score high points you can pick up Boris' banana. This causes him to loose his temper and chase you.

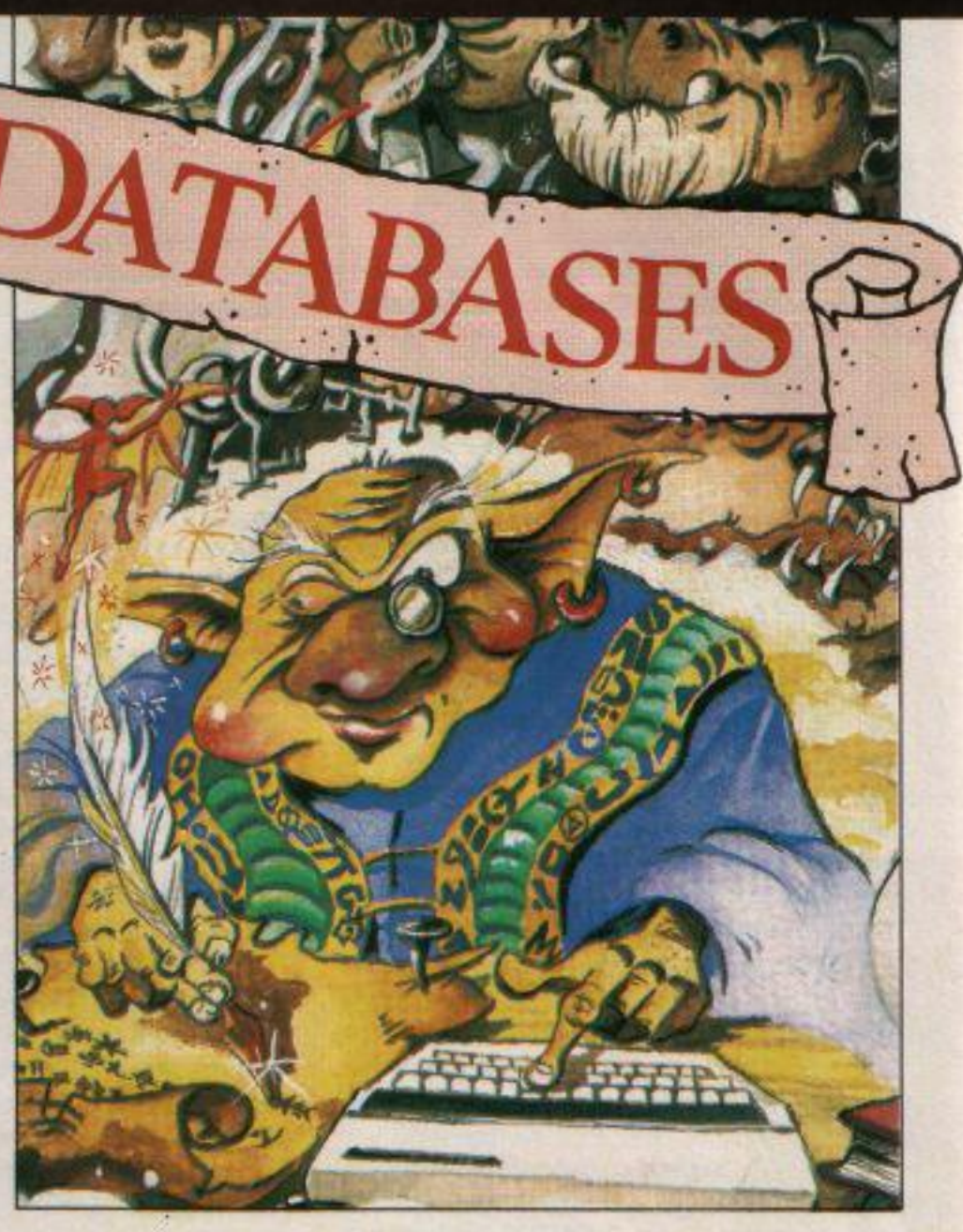
If you manage to recolour all the cubes you move to a new and more complex screen. There are four in all, which means that with 10 levels and two speeds, there are 80 possible combinations to choose from

A few years ago this game would have rated as amazing value at only £1.99. Now, it is merely ordinary, though it will amuse the kids with its bright and cheerful graphics.

Rog Frost

Sound	*6*
Graphics	*8*
Playability	*5*
Value for money	*7*
Overall	*6*

DEMONIC DATABASES



BILL TREVELYAN introduces the command parser in Part IV of his adventure writing series

YOU are in the middle of a text adventure game and on the screen you see:

```
The door flies open and a
huge, ape-like figure
shambles in, brandishing a
chainsaw, which chatters
menacingly into life!
What now?
```

and rather desperately you type something.

The command you enter determines what the next step in the game will be, what appears next on the screen, and which of the variables held in the database are to be updated.

The routine which processes your input is called a command analyser, or parser. Parsing is a term in grammar meaning the resolution of a sentence into verbs, nouns, adjectives and so on.

You could devise a system which accepted not words but numbers. However, talking to a computer in English and getting it to reply has a compelling fascination which is half the fun of playing adventure games.

Normally a command entered into an adventure is made up of one or two words, which to the player are a verb in the imperative, followed by a noun which usually denotes an object which can be picked up, dropped and so on.

By convention, directions such as North, strictly speaking adverbs, are treated as verbs.

The computer knows nothing of verbs or objects, but searches a list held in the database for a word identical to one in the command. The index number or rank order of the matching word determines which subroutine is to be called next.

Similarly, the position of the matching word in a list of objects allows the subroutine to examine whether an object is held by the player and to update variables associated with it.

A good parser makes playing a game enjoyable. Once the player has arrived at the right idea, he should be able to frame a command the program will accept without too much trouble.

It is frustrating to have to spend hours trying combinations of words before you discover what will work.

At one point in Myorem, the walls of a tunnel threaten to close in. Obviously the strong metal fire extinguisher is meant to keep the walls apart.

It took me ages before I hit on THROW EXTINGUISHER NORTH. North is treated here as an adverb, but elsewhere as a verb.

Advanced parsing routines can handle long sentences and multiple commands – Epic Software's Wheel of Fortune is a typical example.

Although such parsers are technically admirable, they may not be as welcome as a simple routine which offers a wealth of synonyms.

Features like the CONTINUE command in The Lost Crystal are a real boon, especially when there's a lot of to-ing and fro-ing to be done.

Let's now construct a simple command parsing routine, which will process a command made up of two words – a verb and a noun.

The keyword INPUT, corresponding to the operating system subroutine osword with A equal to zero in assembly language programming, will let you enter a complete sentence in one go.

Alternatively GET, the Basic equivalent to osrdch accepts what the player types one character at a time.

In either case the first step is to convert the command to a standard form, in which characters are all upper case, or all lower case.

To convert lower to upper case, you need to bitwise AND the byte holding an Ascii code with &DF (binary 11011111), to clear bit 5. ORing a byte with &20 (binary 00100000) does the reverse – bit 5 is set and upper case is changed to lower case.

PROCc in Program I uses INPUT to accept a sentence entered at the keyboard and places the string at a pre-selected address in memory, in this case &900.

This is preferable to relying on Basic string variables as our string is stored in one of the pages in memory which otherwise wouldn't be used by a Basic program. It is also easier to convert it into standard, lower case format.

We could now do what we did in our adventure game last month – compare the command with each of the commands understood by the program in turn, to find a match.

However, it is more usual to assign an index number to the two words of the command, which allows much faster operation.

For this we need a list of verbs and a seperate list of nouns in the database vocabulary to compare with what the player has entered. This is provided in the form of data.

The verbs and nouns have been truncated to three characters at most. This is to save memory and more importantly, to save time as searching a long list in Basic can be slow.

Each verb is coupled with

an index number, so synonyms, that is, words which have the same meaning, have the same number. This is convenient, but not absolutely necessary.

In an adventure you usually aren't given a list of verbs in advance, so providing a good choice for the player is important. You are told however, what an object is called the first time it turns up, so synonyms aren't mandatory.

PROCv in Program I takes the three letter verbs in the vocabulary one at a time and uses INSTR to determine if the same string can be found at the beginning of the command – INSTR(command, verb) returns one.

If a match is found, the verb number is returned in *V%*. If this is zero, no match can be made.

With a noun we want to find if the string is the same as the second word of the command. As no noun in the vocabulary has less than three characters (unless you wish your player to fight an Ox) this means a match with the first three characters following a space.

A space character is tacked on to the noun string before the comparison is attempted in line 420. The rank occupied in the list by the noun is returned in *O%* if a match exists, if not, it returns zero.

Now you have a simple command parser which accepts a two word command and returns an index number for the verb and noun you have entered.

```
  10 REM Program I
  20 :
  30 MODE 6
  40 C%=&900
  50 PROCc
  60 CLS:PRINT TAB(0,5) "Co
mmand is: ";$C%
  70 IF G%=0 THEN END
  80 PROCv
  90 PRINT TAB(10,10) "Verb
 number is ";V%
 100 PROCo
 110 PRINT TAB(10,12) "Noun
 number is ";O%
 120 END
 130 :
 140 DEFPROCc
 150 FOR I%=0 TO &7F:C%?I%=
0:NEXT
 160 PRINT"What next?"
 170 PRINT STRING$(9,"=")
 180 INPUT" - "$C%
 190 len%=LEN($C%):IF len%<
1 OR len%>&3F THEN VDU7:GOTO
 160
 200 REM Convert to lower c
ase
 210 FOR I%=0 TO len%: IF C
%?I%>64 AND C%?I%<91 THEN C%
?I%=C%?I% OR &20
 220 NEXT
 230 ENDPROC
 240 :
 250 DEFPROCv
 260 RESTORE 5000
 270 READ n%
 280 I%=0:REPEAT
 290 I%=I%+1
 300 READ V%,vb$
 310 IF INSTR($C%,vb$)=1 UN
TIL TRUE:ENDPROC
 320 UNTIL I%=n%
 330 V%=0
 340 ENDPROC
 350 :
 360 DEFPROCo
 370 RESTORE 5100
 380 READ n%
 390 O%=0:REPEAT
 400 O%=O%+1
 410 READ ob$
 420 ob$=" "+ob$
 430 IF INSTR($C%,ob$)>0 UN
TIL TRUE:ENDPROC
 440 UNTIL O%=n%
 450 O%=0
 460 ENDPROC
 470 :
 4990 REM Vocabulary
 5000 DATA 30:REM Total numb
er of verbs
 5010 DATA 1,nor,2,sou,3,eas
,4,wes,5,up,6,dow
 5020 DATA 7,loo,8,inv,9,sav
,10,loa,11,qui,11,end
 5030 DATA 12,jum,12,lea,13,
exa,14,sea,15,get,15,tak
 5040 DATA 16,dro,17,thr,18,
ope,19,clo,20,cut
 5050 DATA 21,loc,22,unl,23,
rea,24,wri,25,pus,26,pul,27,
lig
 5060 :
 5100 DATA 10:REM Total numb
er of objects
 5110 DATA doo,key,box,lam,b
oo,lev,rop,swo,bot,bot
```

Program I

This works well, but it does have some snags. The program won't accept single letter commands such as N for north, which is something players of adventure games take for granted. It is therefore more usual to split the command into separate words, and match them with lists stored in the database.

In PROCc, the command is converted, if necessary, to lower case, and stored in memory. The following steps assume a space character in the string occurs only between words.

The INPUT command strips off any surplus spaces at the beginning of the string, but the player may have entered a few accidentally at the end so these are stripped also.

If there isn't a space in the command, it's a single word so is stored at a predetermined location in memory. The procedure then ends.

If there is a space, the first word is made up of the characters between the start of the command string and the space. The word is stored and the part of the

Turn to Page 21 ►

```
  10 REM Program II
  20 REM Puts vocabulary in
to database
  30 :
  40 vlist%=&2000
  50 $vlist%="n  *nor*s  *s
ou*e  *eas*w  *wes*u  *up *d
 *dow*loo*inv*sav*loa*qui*e
nd*jum*lea*exa*sea*get*tak*d
ro*thr*ope*clo*cut*loc*unl*r
ea*wri*pus*pul*lig*"
  60 olist%=&2100
  70 $olist%="doo*key*box*l
am*boo*lev*rop*swo*bot*bot*"
```

Program II

```
  10 REM Program III
  20 REM Uses INPUT to isol
ate each word of command
  30 :
  40 MODE 6
  50 C%=&900:vlist%=&2000:o
list%=vlist%+&100
  60 :
  70 PROCc
  80 CLS
  90 I%=0:REPEAT
 100 a$=$(C%+&40+16*I%)
 110 IF a$ <>"" PRINT TAB(1
3,5+2*I%) STR$(I%+1);". ";a$
 120 I%=I%+1:UNTIL a$=""
 130 x$=LEFT$($(C%+&40),3)
 140 IF LENx$<3 x$=x$+" ":G
OTO 140
 150 PROCv:PRINT TAB(5,20)"
Verb is <";x$"> number ";V%
 160 y$=LEFT$($(C%+&50),3)
 170 PROCo:IF O%=&FF PRINT
TAB(5,21) "No noun/object" E
LSE PRINT TAB(5,21)"Noun is
<";y$"> number ";O%
 180 END
 190 :
 200 DEFPROCc
 210 FOR I%=0 TO &FF:C%?I%=
0:NEXT
 220 PRINT"What next?"
 230 PRINT STRING$(9,"=")
 240 INPUT" - "$C%
 250 len%=LEN($C%):IF len%<
1 OR len%>&3F THEN VDU7:GOTO
 220
 260 REM Convert to lower c
ase
 270 FOR I%=0 TO len%: IF C
%?I%>64 AND C%?I%<91 THEN C%
?I%=C%?I% OR &20
 280 NEXT
 290 REM Remove trailing sp
aces from command string
 300 IF RIGHT$($C%,1)=" " T
HEN $C%=LEFT$($C%,LEN$C%-1):
GOTO 300
 310 J%=0:REPEAT
 320 REM Remove leading spa
ces from remaining part of s
tring
 330 IF LEFT$($C%,1)=" " TH
EN $C%=RIGHT$($C%,LEN$C%-1):
GOTO 330
 340 I%=INSTR($C%," ")
 350 W%=(C%+&40+16*J%)
 360 REM If there isn't a s
pace, then word = entire str
ing
 370 IF I%=0 THEN $W%=$C%:G
OTO 420
 380 REM Otherwise word = p
art of string to left of fir
st space
 390 $W%=LEFT$($C%,I%-1):$C
%=RIGHT$($C%, LEN$C%-I%)
 400 J%=J%+1
 410 REM Isolate the rest o
f the string and repeat rout
ine
 420 UNTIL I%=0
 430 ENDPROC
 440 :
 450 DEFPROCv
 460 V%=(INSTR($vlist%,x$)+
3) DIV 4
 470 ENDPROC
 480 :
 490 DEFPROCo
 500 IF y$="" THEN O%=&FF:E
NDPROC
 510 O%=(INSTR($olist%,y$)+
3) DIV 4
 520 ENDPROC
```

Program III

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string to the right of the space becomes the new command string. The routine is repeated until the truncated command is reduced to one word.

To test this procedure we need a vocabulary. This time the lists both consist of a single string consisting of a number of three letter groups followed by a separator, an asterisk in this case.

The triads are the first three letters of a word, nor for NORTH, for instance or shorter groups padded out with spaces "s " for SOUTH.

CHAIN Program II to put the verb and noun lists into memory, then CHAIN Program III. You can enter any number of words as long as you don't exceed 64 characters. These will be separated and printed one below the other.

The first word is taken as the verb and is given an index number, and the second as the noun or object. Note that synonyms do not have the same number. It is interesting to alter the vocabulary to four letters, or two and see the effect on the response time.

Instead of INPUT we can use GET as in Program IV. PROCc prompts the player with "What next?" and calls PROCa.

The characters entered are converted to upper case if necessary. Successive letters are joined together to make a word of predetermined length, three in this case. If this is exceeded, what the player types still appears on the screen, but they don't add to the length of the string stored in memory.

As soon as a space or carriage return is entered, the procedure is terminated. If a space has been typed in, PROCa is again called and a second word isolated.

Lines 5000 onwards form a vocabulary constructed from data. In the verb matching procedure PROCv, a match occurs when the first, first two, or all three characters of the first word of the command are identical with those of an item in the list. So N, NO, NOR and even NORT and NORTH, all return with *V%* equal to one.

This allows single letter commands for the most common verbs, but note that the number returned is the first item to have the same initial letter, so D is taken as DOWN and not DROP.

In the case of nouns PROCo requires a three letter match so you can use G BOX but not GET B.

With a selection from these routines you should be able to construct a satisfactory two word command analyser, made user-friendly with comments like "Please try another verb", "You can't do that", and so on.

Now what do you do with the index numbers for verb and object your program has given you?

The object number *O%* is used by subroutines to extract the appropriate item from say, a list of names of objects like "A short sword", a list of longer descriptions like "A sword with a jewel encrusted handle and an inscription carved on the blade", and especially a list giving the current location number of each object.

The verb number is generally the basis for selecting the subroutine which is going to execute the next step in the game.

Suppose verb one is N, verb two NORTH, verb three S, verb four SOUTH and so on, then after *V%* and *O%* have been found for the command which has been entered:

```
100 ON VX GOSUB 1100,1100,
1250,1250 ELSE GOSUB 1000
```

will direct control to a subroutine starting at line 1100 if the verb was N or NORTH, and to one at line 1250 if it was S or SOUTH.

The double entry isn't required if synonyms like N and NORTH have been allotted the same index number. At line 1000 would be something like:

```
1000 PRINT "You can't do th
at!":RETURN
```

to deal with cases where no match can be found.

You may prefer to use procedures rather than subroutines. This can be done with:

```
500 A%=1000
510 GOSUB (A%+10*V%)
```

which will select from:

```
1000 PROCno_match:RETURN
1010 :
1020 PROCnorth:RETURN
```

the blank lines only being necessary if synonyms like N and NORTH don't have the same index number. If the program has to be renumbered during development, the value of *A%* may have to be adjusted.

A more unusual method of selecting subroutines is illustrated by Program V. You can't call procedures with a general statement like:

```
250 name$="north":PROCname$
```

Turn to Page 22 ▶

```
   10 REM Program IV
   20 REM Uses Basic's GET
   30 :
   40 Z%=0 :REM Counts numbe
r of turns
   50 CLS
   60 PROCc
   70 :
   80 PROCv
   90 PRINT TAB(12,13)"1. ";
x$;
  100 IF V%=0 PRINT" not on
list" ELSE PRINT" number ";V
%
  110 :
  120 PROCo
  130 PRINT TAB(12,15)"2. ";
  140 IF y$="" PRINT"nil":GO
TO 160
  150 PRINT y$;:IF O%=0 PRIN
T" not on list" ELSE PRINT"
number ";O%
  160 END
  170 :
  180 DEFPROCc
  190 Z%=Z%+1
  200 PRINT "What next?"
  210 PRINT STRING$(9, "=")
  220 PRINT " - ";
  230 :
  240 PROCa
  250 x$=y$:IF x$="" THEN 20
0
  260 IF G%=13 THEN y$="":GO
TO 290
  270 PRINT " ";
  280 PROCa
  290 PRINT
  300 ENDPROC
  310 :
  320 DEFPROCa
  330 I%=0:y$=""
  340 REPEAT
  350 I%=I%+1
  360 G%=GET
  370 IF G%=13 OR G%=32 THEN
 UNTIL TRUE:ENDPROC
  380 :
  390 PRINT CHR$G%;
  400 REM Convert lower to u
pper case
  410 IF G%>96 AND G%<123 G%
=G% AND &DF
  420 REM Store only first 3
 chars
  430 IF I%>3 THEN 450
  440 y$=y$+CHR$G%
  450 UNTIL FALSE
  460 ENDPROC
  490 :
  500 DEFPROCv
  510 RESTORE 5000:READ n%
  520 FOR I%=1 TO n%
  530 READ vb$,V%
  540 IF INSTR(vb$,x$)=1 THE
N I%=n%:GOTO 560
  550 V%=0
  560 NEXT
  570 ENDPROC
  580 :
  590 DEFPROCo
  600 IF y$="" THEN O%=&FF:E
NDPROC
  610 RESTORE 5100:READ n%
  620 FOR I%=1 TO n%
  630 READ ob$, O%
  640 IF ob$=y$ THEN I%=n%:G
OTO 660
  650 O%=0
  660 NEXT
  670 ENDPROC
  680 :
 5000 DATA 30
 5010 DATA NOR,1,SOU,2,EAS,3
,WES,4,UP,5,DOW,6
 5020 DATA LOO,7,INV,8,SAV,9
,LOA,10,QUI,11,END,11
 5030 DATA JUM,12,LEA,12,EXA
,13,SEA,14,GET,15,TAK,15
 5040 DATA DRO,16,THR,17,OPE
,18,CLO,19,CUT,20
 5050 DATA LOC,21,UNL,22,REA
,23,WRI,24,PUS,25,PUL,26,LIG
,27
 5060 :
 5100 DATA 10
 5200 DATA DOO,1,KEY,2,BOX,3
,LAM,4,BOO,5,LEV,6,ROP,7,SWO
,8,BOT,9,BOT,10
```

Program IV

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but you can do this with functions:

```
250 name$="north":F%=EVAL(
"FN"+name$)
```

will call FNnorth which will result in *F%* being given a definite value. What's the point of that? you may ask. Suppose a function is defined as:

```
1000 DEF FNnorth
1010 PRINT "You go north."
1100 =0
```

Then F%=FNnorth will make *F%* zero but the important point is that before doing so all the statements in lines 1010-1090 will be executed.

If these were a routine for drawing a circle, a circle would be drawn. Calling the function is only a subterfuge for getting the routine performed.

```
  10 REM Program V
  20 MODE 6
  30 ON ERROR IF ERR=29 THE
N 50 ELSE CLS:END
  40 GOTO 90
  50 CLS:PRINT TAB(0,2);CHR
$7+"Verb not on list!"
  60 :
  90 REPEAT
 100 PRINT TAB(0,4)"Enter
command (verb in lower case)
"
 110 PRINT TAB(0,7);SPC(10)
 120 INPUT TAB(0,7)" --> "x
$
 130 x$=LEFT$(x$,3)
 200 F%=EVAL("FN"+x$)
 210 :
 220 UNTIL F%=&FF
 230 CLS: PRINT TAB(15,12)"
E N D"
 480 END
 490 :
 500 DEF FNnor
 510 PROCprint("North routi
ne")
 520 =1
 530 :
 540 DEF FNqui
 550 PROCprint("Do you real
ly want to quit (Y/N)?")
 560 G$=GET$:IF G$<>"Y" AND
G$<>"y"=0
 570 = &FF
 580 :
1000 DEFPROCprint(a$)
1010 COLOUR0:COLOUR129
1020 xpos=(40-LENa$) DIV 2
1030 PRINT TAB(xpos,20);a$
1040 COLOUR1:COLOUR128
1050 ENDPROC
```

Program V

In Program V, as a demonstration of the power of this technique, you are asked to enter a verb. The program will only respond to nor(th) or qui(t) but you can insert as many functions as you like.

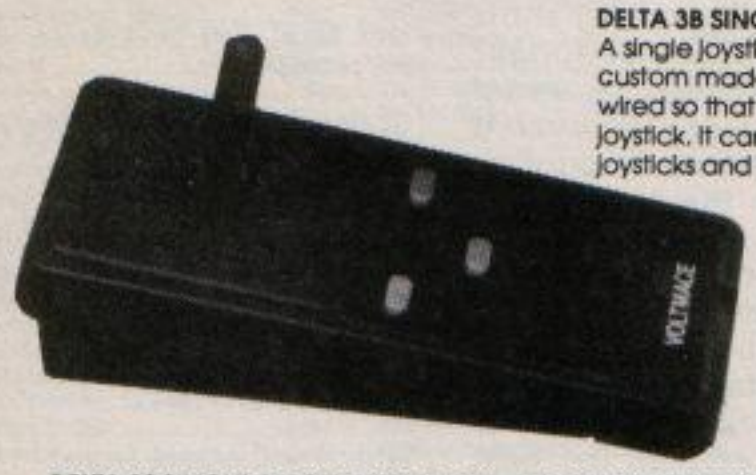
Line 200 directs control to the appropriate function, which returns the value of a flag variable *F%* which serves as a move flag or to signal that the main loop is to be terminated.

In a sense this is a sophisticated version of our game in the September 1987 issue of *Electron User*, as all functions are interrogated in turn to see if a match with the command can be found.

Note that no index number has to be assigned to the verb, but any object still has to be given one.

The error trap in line 30 stops No such FN/PROC from crashing the program when no function can be found to match the command verb. The method has a snag: You can't have synonyms without destroying its chief virtue simplicity.

JOYSTICKS— THE COMPLETE SOLUTION



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Restore your ADFS workspace

ROLAND WADDILOVE shows how to access the ADFS after relocating a program

ONE of the bugbears of the otherwise excellent Advanced Disc Filing System (ADFS) in the Plus 3 is that it consumes a vast amount of memory.

On power-up or after Control+Break the ADFS grabs nearly 4k of free ram. This leaves just 4.5k of memory for your program if you want to use all eight colours in Mode 2 or high resolution Mode 0.

This is a serious problem for programmers developing software and is one of the reasons why there are so few games available on Plus 3 disc.

There are remedies though, but these create more problems. The standard solution to the lack of memory is to load the program in Mode 6, select the tape filing system and relocate the program by moving it down to &E00.

This recovers the lost memory and enables much longer programs to be run from disc. Many *Electron User* games use this method.

Problems occur, however, when you want to access the disc again. If you try moving the program back up to &1D00 and select the ADFS you'll just get error messages.

Once you've used the ADFS' workspace it won't initialise itself and steadfastly refuses to work. So, you can't access the disc once a program has been relocated.

The only solution is to clear the memory used by the ADFS either by switching the Electron off or pressing Break after entering *FX200,2.

This is a nuisance if you are developing software, or even simply typing in an *Electron User* listing, and makes menu driven programs which run from disc impossible – until now.

ADFS Restore, the utility presented here, will enable a program that has been relocated to access the disc system. It works by relocating the program again – moving it back up to &1D00 – before initialising the ADFS.

The program is written in machine code and occupies just one page of memory – 256 bytes. To create the utility, first enter the listing, save it then run it. The machine code will be saved to disc with the name ADFS.

When you want to run a program which relocates down to &E00 first load the machine code with:

```
*LOAD ADFS
```

and then CHAIN your program as normal.

To access the disc, Escape from the program (don't press Break) and call Restore with:

```
CALL &900
```

Your program will be moved back up to &1D00, the ADFS initialised and the disc in the drive *MOUNT-ed. You can now save the program or CHAIN another. The program stays intact throughout the operation – which takes just a fraction of a second.

The utility is quite straightforward and is in two sections. The first part moves the program back up to &1D00 and the second initialises the ADFS.

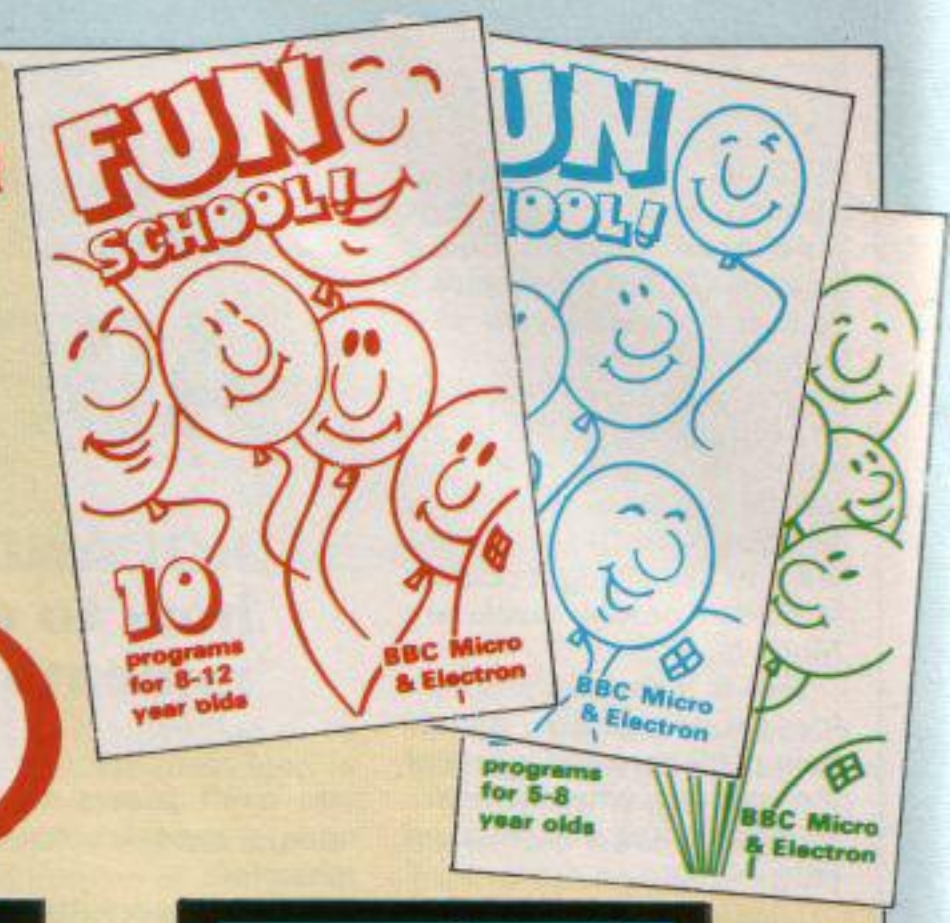
You'll see two data statements at the end of the listing containing around 130 bytes of data. This is the whole of the ADFS' 3.75k (3,840 bytes) of workspace in a highly compacted form.

The second half of the utility simply expands this data, restoring the ADFS workspace so that it thinks you've either just switched on or pressed Control+Break. It then selects the ADFS with *ADFS and mounts the disc with *MOUNT.

This powerful utility opens up a whole new world and it's now possible to run long programs from disc, relocate them and still be able to access the disc afterwards – without pressing Break or switching off.

```
10 REM ADFS Restore
20 REM By R.A.Waddilove
30 REM (c) Electron User
40 workspace=&70
50 from=&72
60 to=&74
70 FOR pass=0 TO 2 STEP 2
80 P%=&900
90 [OPT pass
100 \relocate program
110 LDY #0:STY workspace
120 STY from:STY to
130 CLC
140 LDA #&50:STA from+1
150 LDA #&5F:STA to+1
160 LDX #&43
170 .loop
180 LDA (from),Y
190 STA (to),Y
200 DEY:BNE loop
210 DEC from+1:DEC to+1
220 DEX:BNE loop
230 LDA #138
240 LDY #128
250 JSR &FFF4
260 LDX #key MOD256
270 LDY #key DIV256
280 JSR &FFF7
290 \restore ADFS
300 LDA #&E
310 STA workspace+1
320 LDX #0
330 .loop
340 LDA table,X
350 LDY table+1,X
360 .again
370 DEY
380 STA (workspace),Y
390 BNE again
400 CLC
410 LDA table+1,X
420 ADC workspace
430 STA workspace
440 BCC ok
450 INC workspace+1
460 .ok
470 INX:INX
480 CPX #&8A:BNE loop
490 RTS
500 .key
510 EQUS "K.0PA.=&1D00|MO.
|M*ADFS|M*MOU.|M"+CHR$13
520 .table
530 ]
540 NEXT
550 REPEAT
560 READ a$
570 !P%=EVAL("&"+a$)
580 P%=P%+4
590 UNTIL a$="1FF"
600 *SAVE ADFS 900 +100
610 DATA FF00FF00,1100200,
1010300,CFF2700,1788900,1FF2
200,1221B00,16E0155,1650173,
1220174,160010D,12201F6,16E0
155,1650173,1220174
620 DATA 160010D,CFF01F6,F
F00FF00,FF00FF00,FF00FF00,FF
00FF00,FF00FF00,122EA00,16E0
155,1650173,1220174,160010D,
12201F6,16E0155,1650173,1220
174,160010D,CFF01F6,171DE00,
1FF
```

Learning CAN be fun



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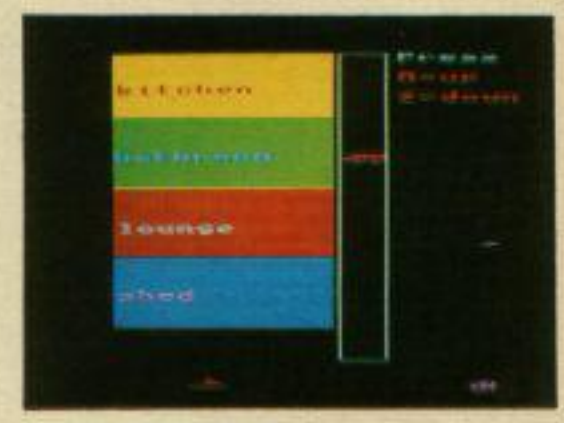

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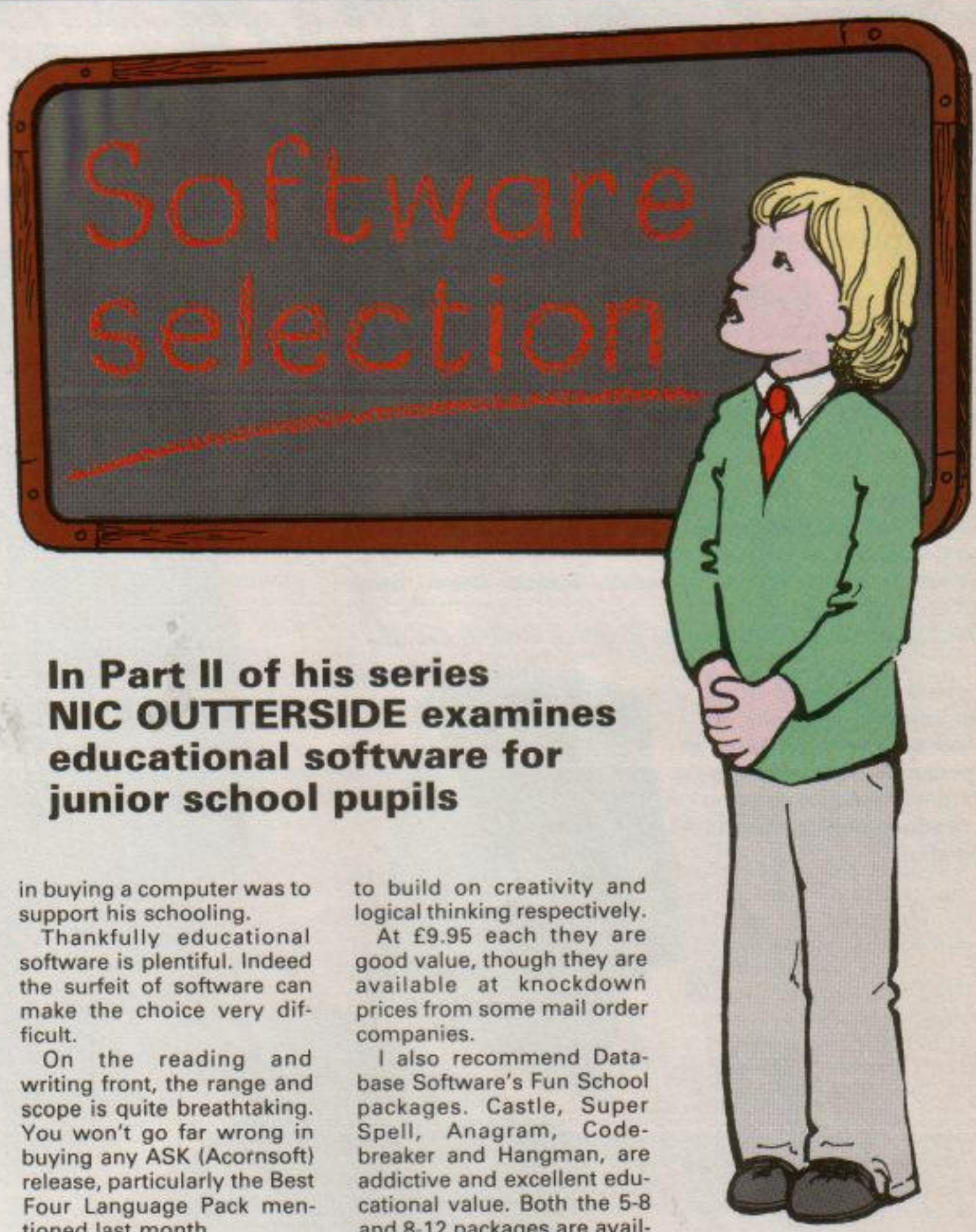
TO ORDER TURN TO THE FORM ON PAGE 53



Software selection

In Part II of his series NIC OUTTERSIDE examines educational software for junior school pupils

I INTRODUCED the concept of using the Electron as a prime means of supporting your child's school-based education last month. I also looked at the availability of educational software for the pre-school and infant age group.

Now I want to deal with the demanding and important junior school years.

My first experience of a micro as an instrument of learning was fairly disastrous. As a head of department in a thriving middle school, I was presented with what appeared to be a sparkling pocket calculator with a funny looking box attached to the back.

The calculator was in fact a Sinclair ZX81 and my headmaster was determined I should initiate my charges to computer-based learning.

None of the nine year olds in my group had ever seen a computer before and were as puzzled as I was in our efforts to make sense of the buttons and wires.

Eventually after dozens of attempts to stop the ram pack wobbling and some over-heating problems, I returned the miracle to my headmaster with the suggestion that somebody else might like a go.

It was an experience neither I, nor I suspect, my pupils will never forget. Yet only six years later we, as teachers and parents, are coping with 7 to 11-year-olds who are, on the whole, computer literate.

This year is the first time I can say that children in all four years of my junior school have a full working knowledge of micros. While I, as their headteacher, write for a national computer magazine. How quickly time and knowledge changes.

Meanwhile at home, as parents we become disillusioned as little Johnny spends every waking hour bashing space-invaders, when our original intention in buying a computer was to support his schooling.

Thankfully educational software is plentiful. Indeed the surfeit of software can make the choice very difficult.

On the reading and writing front, the range and scope is quite breathtaking. You won't go far wrong in buying any ASK (Acornsoft) release, particularly the Best Four Language Pack mentioned last month.

For the older child ABC, Talkback and Workshop provide some avant-garde ideas in language education, but are not a substitute for structured teaching of spelling and reading.

Highlight Software's Read Right Away and Reading Packs 1-4 are excellent value and provide a varied assortment of reading and spelling programs.

Magic E, Break-in, Sort out and Letter bug are particularly good programs which will probably be played ad-nauseam.

The Mr Men Magic Story Maker and Crack-It Towers from Mirrorsoft are two particularly relevant programs to build on creativity and logical thinking respectively.

At £9.95 each they are good value, though they are available at knockdown prices from some mail order companies.

I also recommend Database Software's Fun School packages. Castle, Super Spell, Anagram, Codebreaker and Hangman, are addictive and excellent educational value. Both the 5-8 and 8-12 packages are available at only £4.95 each.

Golem Software is a company I have long admired and its Fun with Words, Education 1 and 2 packages are bargains at £6.50 each.

Particularly helpful are Suffix, There and Hangman which develop spelling and phonic structure in a most imaginative way.

Each of these programs can be introduced to the child with the minimum of explanation and he or she can be left to enjoy the software for its own sake. Obviously, back-up written work would be advantageous though not altogether essential.

For the BBC Micro, 4Mation has earned a reputation as producer of excellent text adventure-based learning programs.

Your child may well be familiar with Granny's Garden or Flowers of Crystal already. Although 4Mation do as not yet code its software for the Electron, there are some superb adventure based programs from other suppliers.

Comsoft's Serpent's Lair is currently selling at £3.95 and is an excellent introduction to this genre. Equally, LCL's Sir Francis Drake is an

Turn to Page 27 ▶

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DATABASE PUBLICATIONS

◀ From Page 25

educational and exciting jaunt into the land of adventures.

Other good introductory adventures which come to mind include Usborne's Island of Secrets, Potter's Adventure 4 Pack and Acornsoft's Sphinx Adventure.

These can act as a medium to stimulate reading, improve spelling and increase powers of logical decision-making. They can become addictive, and provide stimulus for other creative work, such as model making or story writing.

Kosmos Software's Answer Back quizzes are upmarket educational rearrangements of the Trivial Pursuit concept and can act as stimuli for further learning and can provide hours of family fun.

At £8.95 with factfiles at only £4.95 each, they are sound educational investments.

On a more diverse track, BBC Soft's Wordplay is a marvellous introduction to word processing and at £9.95 may provide a springboard for your child's future creative writing.

Software to help numeracy development and general primary mathematics also abounds, though liaison between home and school is important here to avoid concept clashes.

Duckworth's Competitive Maths is a good buy at £5.95 and will help strengthen mental arithmetic and consolidation in the four rules of number.

Micro Power's Junior Maths Pack is also excellent value with Number Spin and Coordinates being computer adaptations of classroom teaching techniques.

Quick Thinking Plus by Mirrorsoft is a scintillating package with two games to give practice with number skills.

Sum Vaders requires quick thinking in addition, subtraction, multiplication and division to halt alien space-craft from landing.

Robot Tables gives a player the chance to create robots using number sequencing skills.

A program I have used to exhaustion is ASK's Table Adventures, which includes four games to improve tables knowledge. Underground Escape is my favourite. It involves mastery of factors in order to escape from a quickly flooding pothole.

Each stage progresses to a final self test. The whole package is exciting and graphically outstanding, and at £9.95 must represent a bargain.

Once again I recommend the Fun School 5-8 and 8-12 packages. Denary Derrick, Hilo, Balance, Number signs, Maths Hike and Towers of Hanoi are mind-stretching pieces of wonder which together with the aforementioned language offerings, are an essential purchase for any parent of a primary age child.

Other Database Software programs I have used extensively with youngsters include Angler, Table Mountain, Mapping, Manipulation and Fun Factors.

Angler is an original game which helps a child estimate the size of angles up to 45 degrees. Mapping involves careful use of mapping diagrams to display number bonds.

Fun Factors is a colourful ladders and levels game to consolidate factor knowledge.

Manipulation is an advanced calculation exercise which will stretch even adult minds, while Table Mountain is a fabulous program to teach and practise multiplication tables.

Each of these programs has been featured in back issues of *Electron User* and in the Educational Specials published in 1985.

They have also been available on occasional tape offers such as Educational Special Volume 2, which at £3.95 is an absolute giveaway.

All add a new dimension to a subject which for many children is difficult or even boring. Maths is fun, and computer based mathematics is truly exciting, even for the innumerate pupil.

So all in all, the software is available and will do much to change a games orientated computer into a vital learning aid.

You never know, your child may even end up preferring the educational software to the shoot-'em-up trivia to which he once was so addicted.

As I mentioned last month, most of the software mentioned can be ordered from the software mail order companies which advertise in this magazine. Notably, 21st Software, Rams Computer Centre, C&F Associates and Mithras offer many at sale prices. ■

Contacts

ABC
19 Crumstone Court, Killingworth, Tyne and Wear

Applied Systems Knowledge (ASK)
London House, 68 Upper Richmond Road, London SW15 2RP
Tel: 01-874 6046

BBC Soft
35 Marylebone High Street, London W1M 4AA

Database Software
Europa House, 68 Chester Road, Stockport SK7 5NY
Tel: 061-456 8383

Duckworth
The Old Piano Factory, 43 Gloucester Crescent, London NW1 7DY
Tel: 01-485 3484

Golem Software
77 Qualitas, Bracknell, Berkshire RG12 4QG
Tel: 0334 50720

Highlight Software
36 Sherbourne Close, Barry, South Glamorgan

Kosmos Software
1 Pilgrims Way, Harlington, Dunstable, Bedfordshire

LCL
26 Avondale Avenue, Staines, Middlesex

Micropower
Software Bargains, 8/8A Regent Street, Leeds LS7 4PE
Tel:0532 687735

Mirrorsoft
Maxwell House, 74 Worship Street, London EC2A 2EW
Tel: 01-377 4600

ENTER THE THIRD DIMENSION...

ANDRÉ MOERENHOUT shows how to create 3D wireframe graphics on the Electron

YOU'VE probably seen three dimensional representions of aircraft, machine parts, molecular structures and whatever else the human mind can think of created on powerful micros and mainframe computers.

They can be rotated enlarged and reduced, apparently without effort, by pieces of software that are without doubt very complex, running on computers much faster than our own, humble Electron.

Surprisingly, the basic idea is simpler than you may at first imagine.

In this article we're going to see how we can produce our own 3D images on the Electron.

To understand the workings of 3D graphics, it is first necessary to understand 2D or flat plane graphics.

The computer screen can be thought of as being a flat plane, somewhat akin to a sheet of paper. As such we can only move in four absolute directions – left and right in the X plane or up and down in the Y plane.

By drawing relative to both planes at the same time we produce diagonal lines, and by varying the relative speeds we can vary the angle and curvature of a given line.

In 3D space however, we have to consider another physical plane, known as the Z plane. The position of any point on the Z axis is its distance from the observer.

This is not as strange as it may appear. Everything we do in life, from picking up your cup of tea to driving a car, involves movement through 3D space.

Our brains calculate the distance an object is away from us (its position on the Z axis) using both eyes, so-called binocular vision.

Try closing one eye and then moving around, picking things up and so on. Because you now see everything in two dimensions, distance becomes much more difficult to judge.

The position of an object in 3D space can be defined by specifying its X,Y,Z coordinates. Figure I shows the positions of the X,Y and Z axes and the coordinates of a cube, which is centered around 0,0,0.

For the moment let's forget the Z coordinates. This leaves us with the X,Y

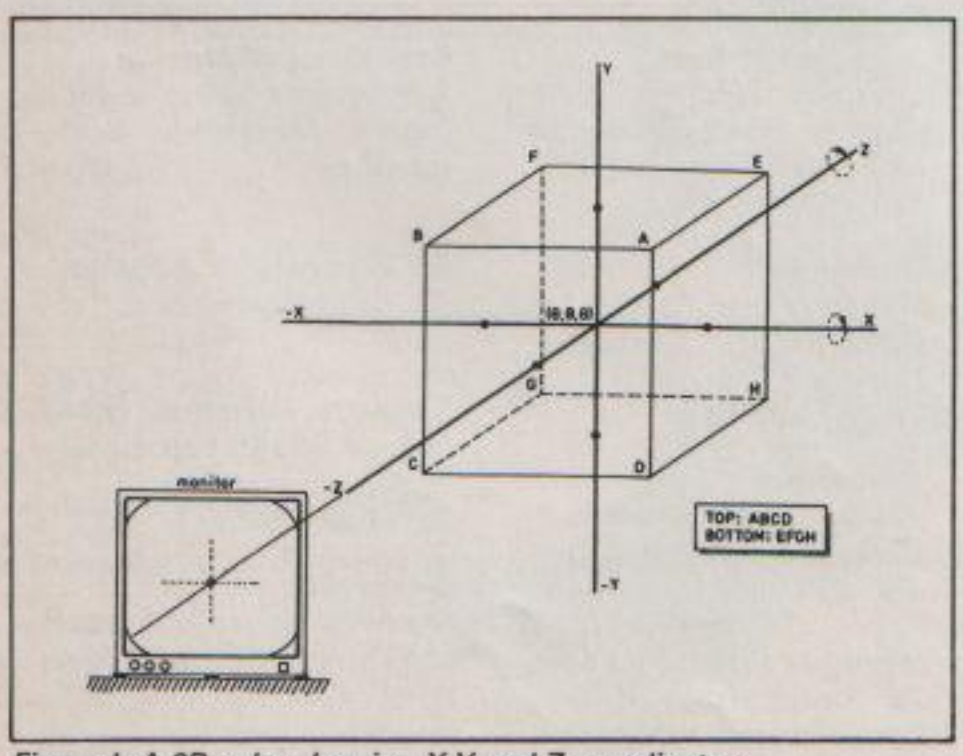


Figure I: A 3D cube showing X,Y and Z coordinates

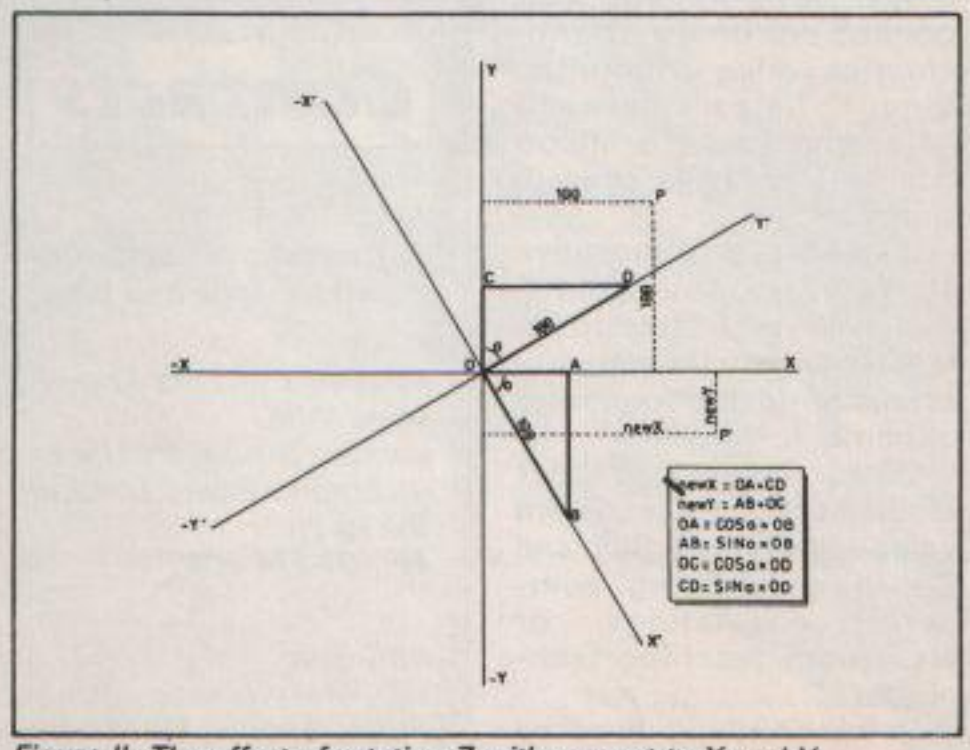


Figure II: The effect of rotating Z with respect to X and Y

```
  10 REM 3D Cube
  20 REM By A.P.Moerenhout
  30 REM (c) Electron User
  40 :
  50 MODE4
  60 VDU23;8202;0;0;0;
  70 PROCinit
  80 REPEAT
  90 PROCcalc
 100 CLG
 110 VDU28,32,31,39,1
 120 PRINT"xturn%"zturn%"
xstep%"zstep%"dist%"scal
e"dstep%"sstep
 130 VDU28,27,31,39,21
 140 FOR I%=0 TO 7
 150 IF I%=4 PRINT
 160 PRINTp%(I%,0),p%(I%,1)
 170 NEXT
 180 PROCplot
 190 xturn%=(xturn%+xstep%)
MOD 360
 200 zturn%=(zturn%+zstep%)
MOD 360
 210 dist%=dist%+dstep%
 220 scale=scale+sstep
 230 UNTIL0
 240 END
 250 :
 260 DEFPROCinit
 270 DIM p%(7,1)
 280 @%=&00405
 290 PROCvars
 300 MOVE0,0:DRAW1279,0:DRA
W1279,1023:DRAW0,1023:DRAW0,
0
 310 MOVE32,32:DRAW736,32:D
RAW736,991:DRAW32,991:DRAW32
,32
 320 VDU19,0,4;0;
 330 VDU23,1,0;0;0;0;
 340 VDU24,48;48;720;975;
 350 VDU29,380;512;
 360 VDU28,25,31,39,1
 370 PRINT"xturn: "";ztur
n: "";xstep: "";zstep: "
 380 PRINT"dist : "";scal
e: "";dstep: "";sstep: "
 390 PRINT TAB(4,18)"X's  Y
's";
 400 VDU28,25,31,39,21
 410 FOR I%=0 TO 7
 420 IF I%=4 PRINT
 430 PRINTCHR$(I%+97);":"
 440 NEXT
 450 ENDPROC
 460 :
 470 DEFPROCvars
 480 dist%=1E6:dstep%=0
 490 scale=1.5:sstep=0
 500 xturn%=0:xstep%=5
 510 zturn%=0:zstep%=5
 520 ENDPROC
 530 :
 540 DEFPROCcalc
 550 LOCAL x%,y%,z%,xts,xtc
,zts,ztc,R
 560 RESTORE 700
 570 xts=SIN(RAD(xturn%))
 580 xtc=COS(RAD(xturn%))
 590 zts=SIN(RAD(zturn%))
 600 ztc=COS(RAD(zturn%))
 610 FOR I%=0 TO 7
 620 READ x%,y%,z%
 630 R =dist%/(dist%+x%*zts
*xts-y%*ztc*xts+z%*xtc)*scale
 640 p%(I%,0)=(x%*ztc+y%*zt
s)*R
 650 p%(I%,1)=(y%*ztc*xtc-x
%*zts*xtc+z%*xts)*R
 660 NEXT
 670 ENDPROC
 680 :
 690 REM Cube coordinates
 700 REM Top plane (ABCD)
 710 DATA  100, 100,-100
 720 DATA -100, 100,-100
 730 DATA -100,-100,-100
 740 DATA  100,-100,-100
 750 REM Bottom  plane (DEF
G)
 760 DATA  100, 100, 100
 770 DATA -100, 100, 100
 780 DATA -100,-100, 100
 790 DATA  100,-100, 100
 800 :
 810 DEFPROCplot
 820 PLOT4,p%(0,0),p%(0,1)
 830 FOR I%=1 TO 3
 840 PLOT 5,p%(I%,0),p%(I%,
1)
 850 NEXT
 860 PLOT5,p%(0,0),p%(0,1)
 870 FOR I%=4 TO 7
 880 PLOT5,p%(I%,0),p%(I%,1)
 890 NEXT
 900 PLOT5,p%(4,0),p%(4,1)
 910 FOR I%=1 TO 3
 920 PLOT4,p%(I%,0),p%(I%,1
)
 930 PLOT5,p%(I%+4,0),p%(I%
+4,1)
 940 NEXT
 950 PROCletters
 960 ENDPROC
 970 :
 980 DEFPROCletters
 990 VDU5
1000 FOR I%=0 TO 7
1010 MOVEp%(I%,0),p%(I%,1)
1020 IF p%(I%,0)>0 THEN PLO
T0,10,0 ELSE PLOT0,-42,0
1030 IF p%(I%,1)>0 THEN PLO
T0,0,30
1040 PRINTCHR$(I%+97);
1050 NEXT
1060 VDU4
1070 ENDPROC
```

Program I

pair, which can be used directly as the familiar screen coordinate.

If the cube was drawn in just the X and Y planes, only one side would ever be visible. That of course, is not the correct way to represent a cube.

We want to be able to look at it from every conceivable angle, and above all, from different distances. This is the point where the Z coordinate comes into play.

The following set of equations convert a 3D coordinate X,Y,Z into its 2D equivalent:

```
R=dist/(dist+X*SIN(z)*SIN(
x)-Y*COS(z)*SIN(x)+Z*COS(x
))*scale

XP=(X*COS(z)+Y*SIN(z))*R

YP=(Y*COS(z)*COS(x)-X*SIN(
z)*COS(x)+Z*SIN(x))*R
```

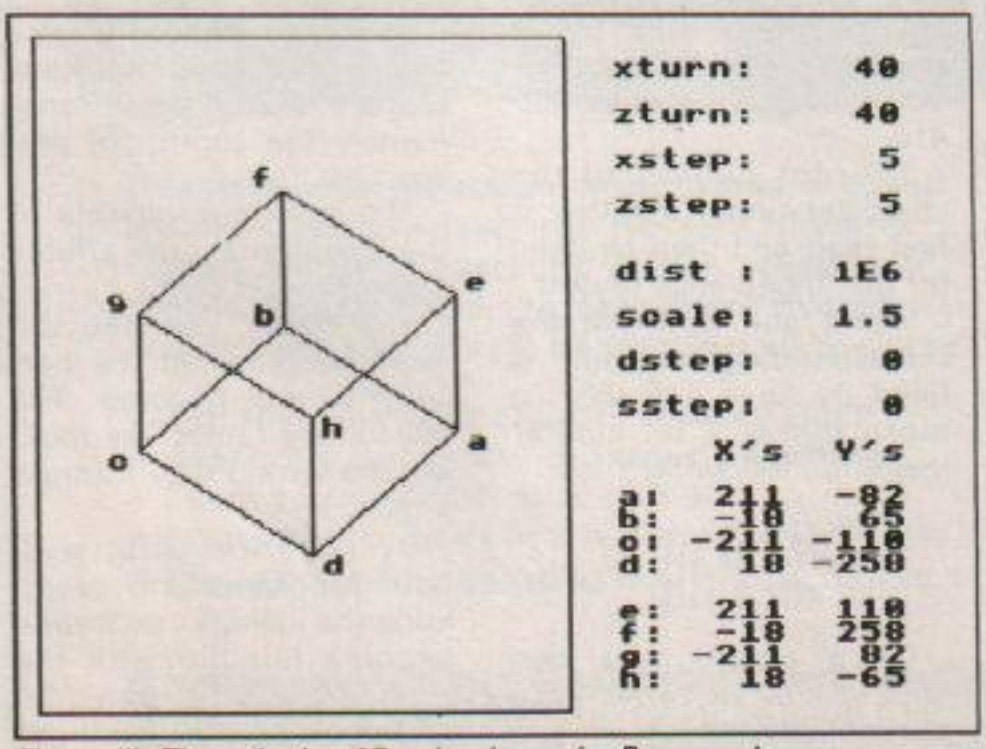


Figure III: The spinning 3D cube drawn by Program I

Unfortunately an explanation of how they work is beyond the scope of this article. The maths involved is advanced, and involves the multiplication and transformation of matrices.

When all the relevant points of a 3D shape are known, however complicated that shape may be, it can be manipulated any way you like by recalculating the coordinates.

To give a hint of how the recalculation works take a look at Figure II, which shows how rotation around the Z axis effects the values of X and Y.

By way of demonstration, Program I rotates a wire frame object through various different views. The program is short and fairly straightforward.

You can experiment with the variables in PROCvars and watch the effect on the object, but be careful not to alter them too much or you'll loose track of what is happening.

As you can see in lines 710-790, the cube is centered around 0,0,0. This

Turn to Page 30 ▶

VARIABLES

x%,y%,z%	Original coordinates
zturn%	Degrees of rotation about Z
xturn%	Degrees of rotation about X
dist%	Distance from the object
scale	The apparent size
p%(r%,c%,n)	New coordinates
R	Coefficient of rotation

```
   10 REM 3D-Text
   20 REM by A.P.Moerenhout
   30 REM (c) Electron User
   40 :
   50 MODE1
   60 PROCinit
   70 PROCstring("User",-200
,2)
   80 PROCstring("Electron",
-50,3)
   90 PROCstring("xturn%="+$
TR$(xturn%),150,1)
  100 PROCstring("zturn%="+$
TR$(zturn%),400,1)
  110 END
  120 :
  130 DEFPROCinit
  140 DIM p%(8,8,1)
  150 PROCvars
  160 xts=SIN(RAD(xturn%))
  170 xtc=COS(RAD(xturn%))
  180 zts=SIN(RAD(zturn%))
  190 ztc=COS(RAD(zturn%))
  200 VDU23;8202;0;0;0;
  210 VDU29,640;512;
  220 VDU19,2,4;0;
  230 ENDPROC
  240 :
  250 DEFPROCvars
  260 dist%=100:scale=1
  270 xsize%=16:xturn%=-10
  280 ysize%=16:zturn%=0
  290 ENDPROC
  300 :
  310 DEFPROCstring(A$,ypos%
,col%)
  320 GCOL0,col%
  330 xpos%=4*xsize%-LENA$*4
*xsize%
  340 FOR L%=1 TO LENA$
  350 FOR c%=0 TO 8
  360 SOUND1,-15,10,1
  370 FOR r%=0 TO 8
  380 PROCcalc(((r%-4)*xsize
%)+xpos%,((4-c%)*ysize%)+ypo
s%)
  390 p%(r%,c%,0)=XP%:p%(r%,
c%,1)=YP%
  400 NEXT
  410 NEXT
  420 A%=10:X%=&80:Y%=0
  430 ?&80=ASC(MID$(A$,L%)):
CALL&FFF1
  440 FOR c%=0 TO 7
  450 FOR r%=0 TO 7
  460 IF c%?&81 AND 2^(7-r%)
 PROCfilldot(r%,c%)
  470 NEXT
  480 NEXT
  490 xpos%=xpos%+8*xsize%
  500 NEXT
  510 ENDPROC
  520 :
  530 DEFPROCfilldot(r%,c%)
  540 PLOT 4,p%(r%,c%,0),p%(
r%,c%,1)
  550 PLOT 4,p%(r%+1,c%,0),p
%(r%+1,c%,1)
  560 PLOT85,p%(r%+1,c%+1,0)
,p%(r%+1,c%+1,1)
  570 PLOT 4,p%(r%,c%+1,0),p
%(r%,c%+1,1)
  580 PLOT85,p%(r%,c%,0),p%(
r%,c%,1)
  590 ENDPROC
  600 :
  610 DEFPROCcalc(x%,y%)
  620 R=dist%/(dist%+x%*zts*
xts-y%*ztc*xts)*scale
  630 XP%=(x%*ztc+y%*zts)*R
  640 YP%=(y%*ztc*xtc-x%*zts
*xtc)*R
  650 ENDPROC
```

Program II

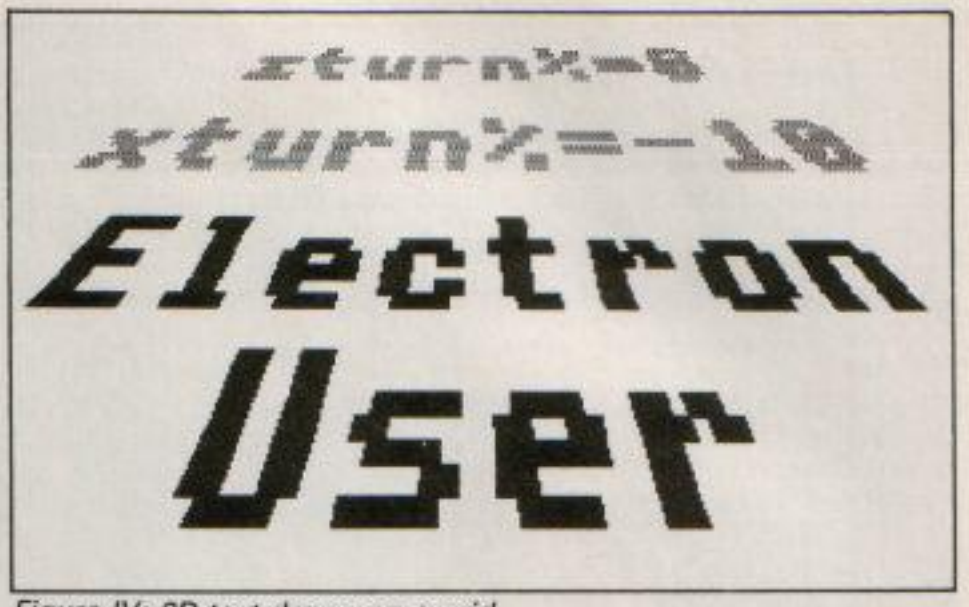


Figure IV: 3D text drawn on a grid

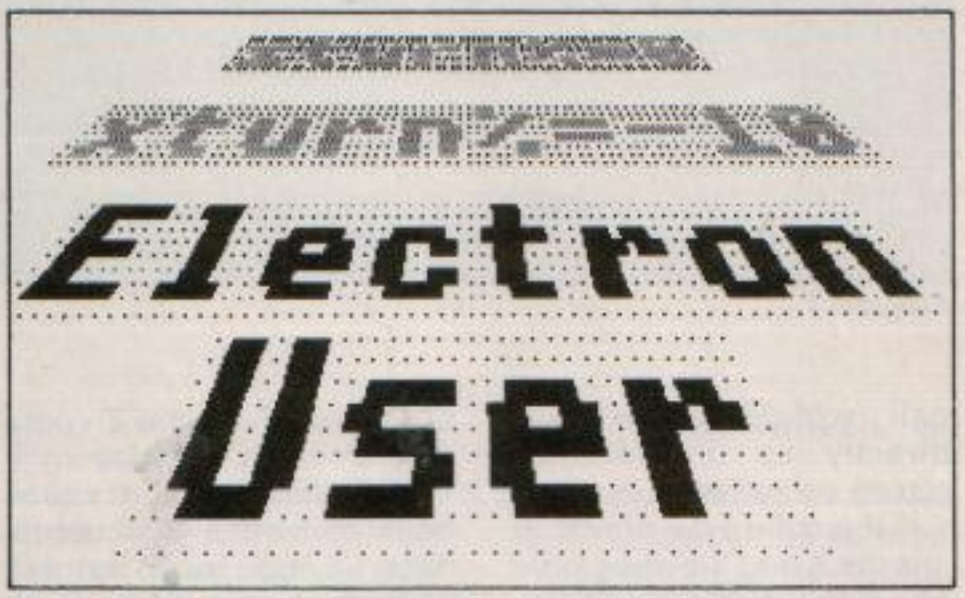


Figure V: 3D text showing the 81 point grid

◀ **From Page 29**

ensures that it stays at approximately the same position on the screen while it is being manipulated.

This is by no means necessary, and the cube could be positioned anywhere on screen, although it could soon vanish if not placed correctly.

Additionally, there's nothing to stop you from putting two or more shapes on the screen simultaneously.

Enter and run program II. It displays 3D text on the screen. The effects obtained can be best explained by holding a sheet of paper in front of your eyes, and turning it without folding or bending, any way you like.

Like Program I, you are rotating a 2D plane in a 3D environment. Anything written on the paper has no depth of its own.

This explains the absence of the Z coordinate in PROCcalc. The text is positioned in the plane Z=0.

PROCstring is the main procedure. Three parameters are passed to it – the string to be printed, the vertical screen coordinate *ypos%* and a colour.

The horizontal coordinate is calculated at line 330. This ensures the text is centered, but you could alter this by specifying *xpos%* when you call the procedure – add a fourth parameter and delete line 330.

Note that the graphics origin is in the middle of the screen.

The procedure sets up an 81 point grid and moves this to the position specified *xpos%*, *ypos%*. All 81 points are then recalculated to new 3D equivalents – lines 350-410.

The dot pattern of the character under scrutiny is first read and then checked for the appearance of dots.

When one is found the corresponding rectangle is filled by lines 440-480. To make things a bit clearer insert the following lines:

```
385 GCOL 0,3
386 PLOT 69,XP%,YP%
387 GCOL 0,col%
```

Once again, you can experiment with the variables in PROCvars. If you hear a tick but can't see anything happening, it probably means the program is plotting off the screen.

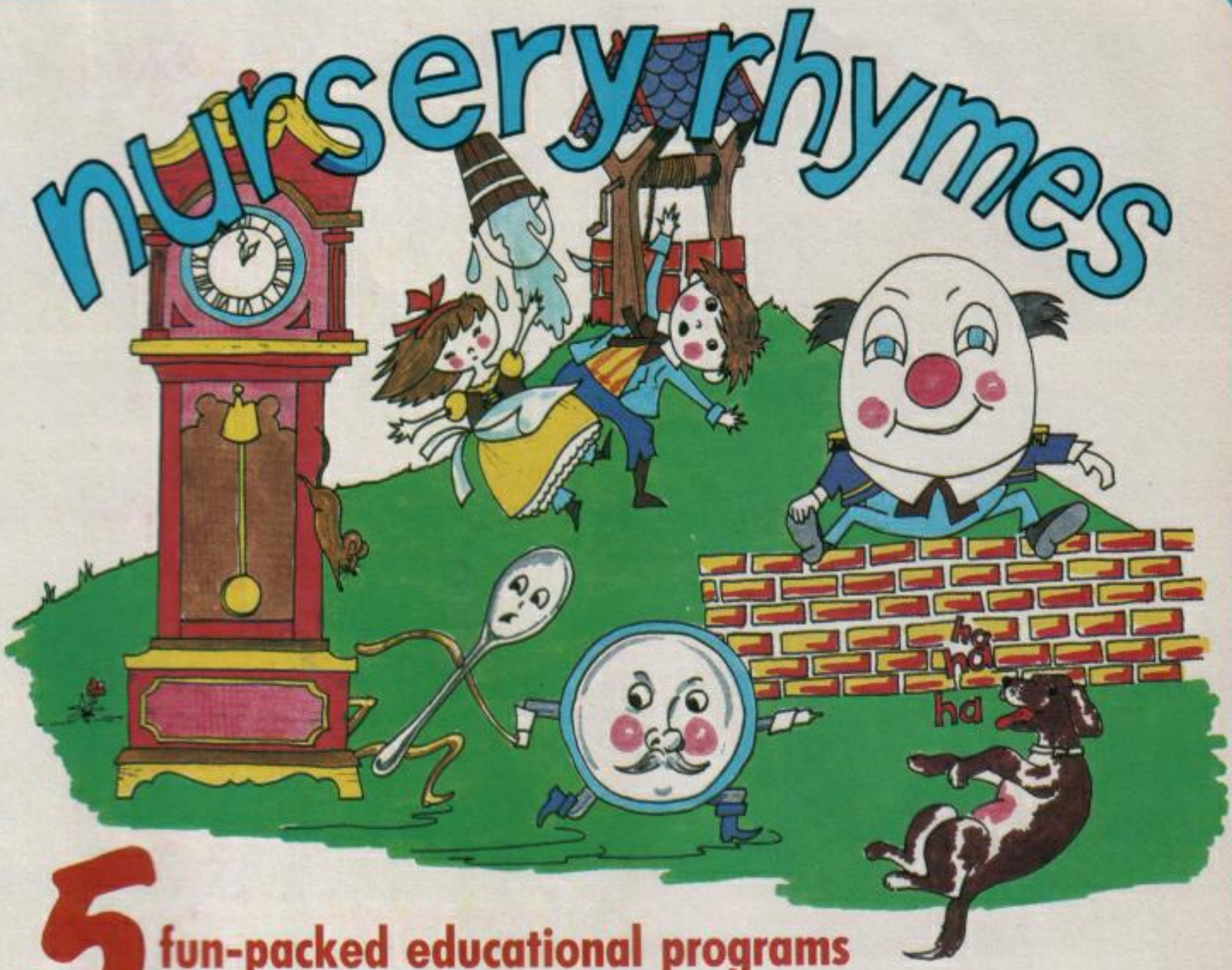
So far I've omitted to say a few words about another feature of the equations, namely the control of perspective.

The principle variable in the programs that affects perspective is *dist%*.

The closer you get, the more pronounced the perspective will become. The effects are rather like looking the wrong way through a telescope.

By experimenting with both programs and examining the listings you'll soon become familiar with the effects which can be produced and the methods involved. ■

nursery rhymes



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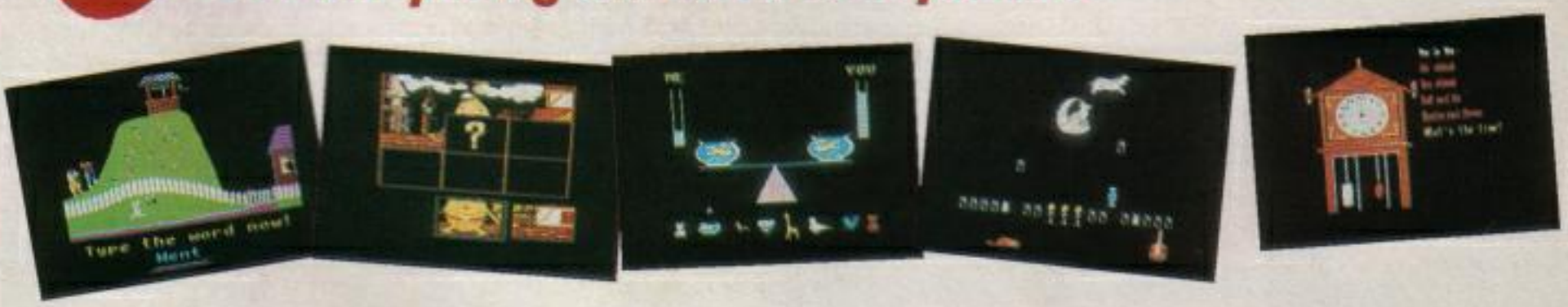

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Witchcraft

Exercise your brain and solve JOANNE STEVENS' intriguing puzzle

WITCHCRAFT is a fascinating puzzle designed to stretch your powers of logic and reasoning to the limit. Slow down, take a break from zapping aliens, give your fingers a rest and exercise the old grey matter for a change.

This one player game is based on a three by three grid, shown in Figure I. The Micro Kid is surrounded by the wicked witch Zelda, and your task is to reverse the situation so the Micro Kid surrounds the witch, as in the puzzle target on the right of Figure I.

The control keys are shown underneath the puzzle and you can zap any of the witches in the grid by pressing the corresponding key below. You can't press a key with the Micro Kid on.

The effect of a key is to switch certain squares so a witch becomes a Micro Kid and a Kid becomes a witch.

The keys in the corners (Q, E, C and Z) reverse a block of four squares, the one in the middle (S) reverses the central cross while the ones in the middle of each side (W, D, X and A) reverse that side. Figure II summarises the effects of the control keys.

Once you have solved this puzzle you'll be presented with the next – there are eight in all. You have 120 seconds (two minutes) to solve the first one, 110 seconds for the second, 100 for the third, then 90 and so on.

If you turn all the squares into the Micro Kid there won't be any witches left to zap and you'll have failed to solve the puzzle. Be careful, this is quite easy to do without realising it.

Turn to Page 35 ►

Figure I: The opening screen

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Educational Computing on the Electron

Volume 2 of *The Micro User* Education Special contains nine full length programs written to the highest standards and each picked to combine educational worth with sheer enjoyment. The nine programs cover topics from early reading and simple sums to the rules of punctuation and angle estimation – and there's an excellent introductory database.

The programs on the tape and disc have been adapted for the Electron and the magazine contains all the original listings together with advice on how they can be adapted to cater for individual needs.

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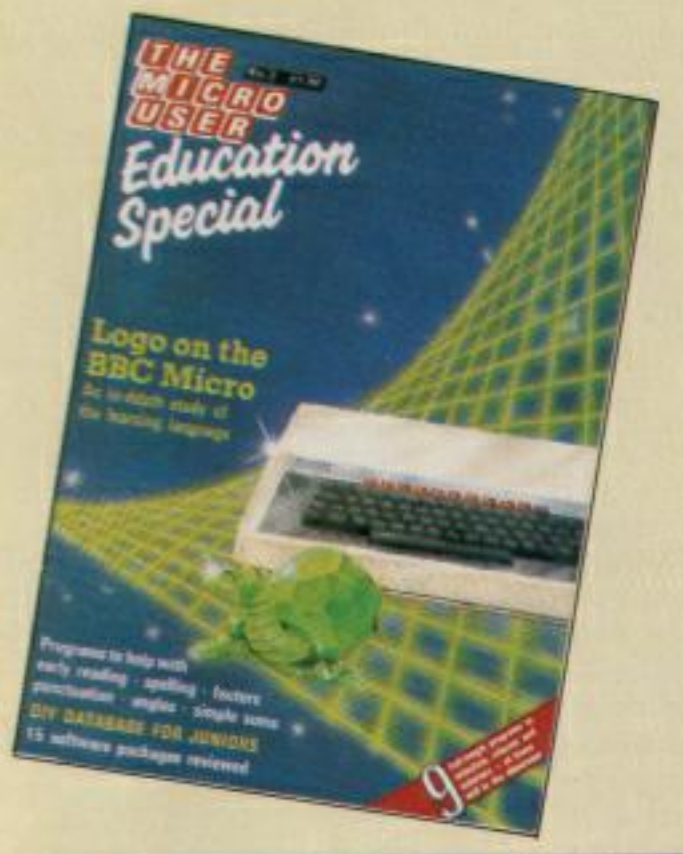

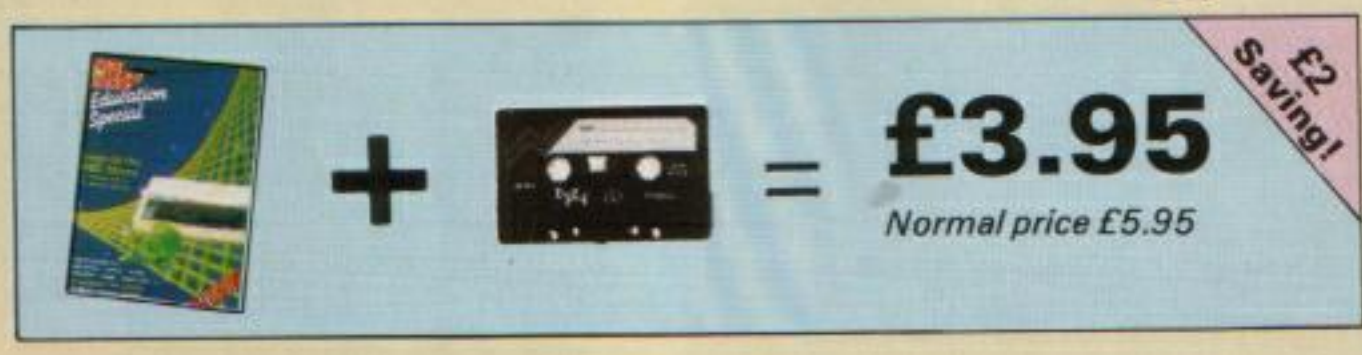

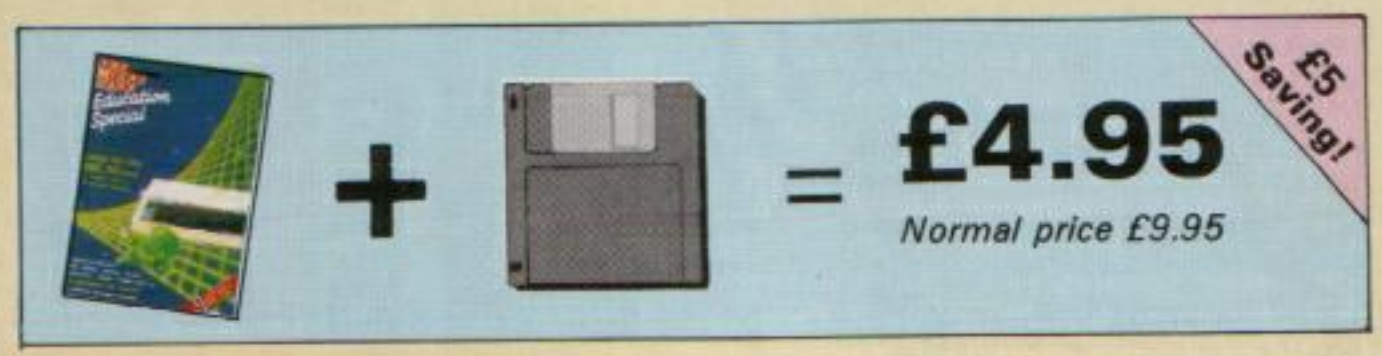

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To order turn to the form on Page 53

Witchcraft listing

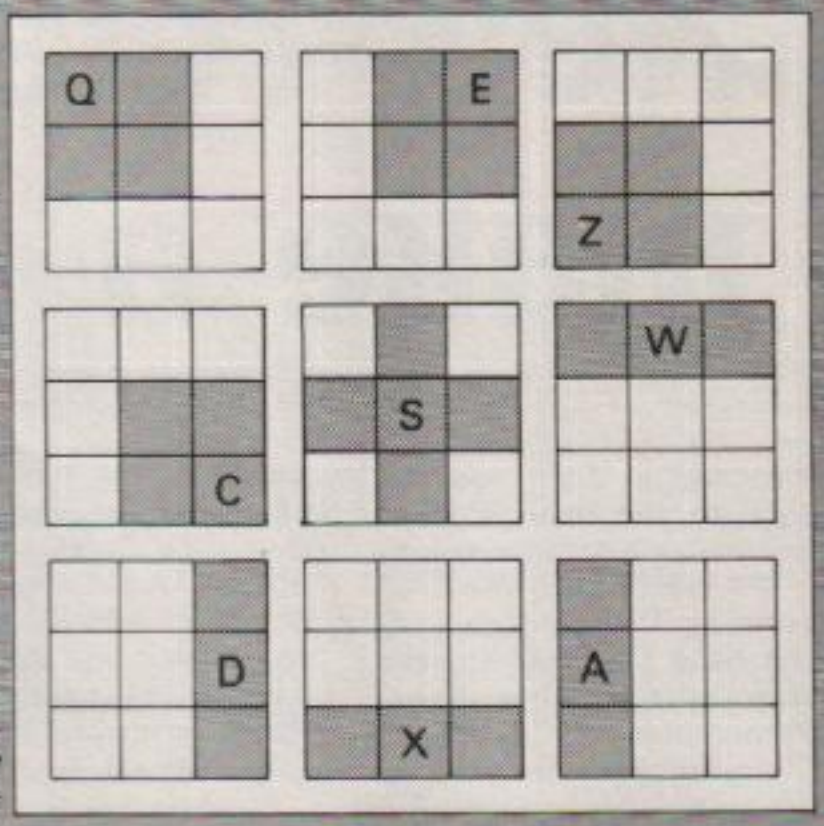
◀ From Page 33

```
  10 REM Witchcraft
  20 REM By Joanne Stevens
  30 REM (c) Electron User
  40 MODE 1
  50 PROCinitialise
  60 PROCscreen
  70 puzzle=0
  80 box%=16
  90 T%=13000
 100 REPEAT
 110 PROCstart
 120 REPEAT
 130 PROCkey
 140 PROCdisplay(box%,5,10)
 150 UNTIL box%=target% OR
TIME>T% OR box%=511
 160 COLOUR 131:COLOUR 0
 170 IF box%=511 OR TIME>T%
 PRINT TAB(9,29)" You have f
ailed... ":box%=511:VDU 7 EL
SE PRINT TAB(12,29)" Well do
ne..."
 180 K%=INKEY500
 190 UNTIL puzzle=8 OR box%
=511
 200 PRINT TAB(6,29)" Do yo
u want to try again? "
 210 IF INSTR("Yy",GET$) TH
EN RUN ELSE MODE 6
 220 END
 230
 240 DEF PROCkey
 250 PRINT TAB(27,25)"Time:
";(T%-TIME)DIV 100" "
 260 K%=INSTR(" QWEASD2XC",
INKEY$0)-2
 270 IF K%>-1 IF K%<9 IF (b
ox% AND 2^(8-K%))=0 box%=box
% EOR rule%(K%):SOUND 0,-9,4
,1:*FX21
 280 ENDPROC
 290
 300 DEF PROCstart
 310 RESTORE 350
 320 FOR I%=0 TO puzzle
 330 READ target%
 340 NEXT
 350 DATA 495,186,341,186,3
81,471,146,325
 360 puzzle=puzzle+1
 370 T%=T%-1000
 380 PROCdisplay(target%,24
,10)
 390 PROCdisplay(box%,5,10)
 400 VDU 7:*FX178,255
 410 COLOUR 131:COLOUR 0:PR
INT TAB(8,29)" Solve puzzle
number ";puzzle;" "
 420 K%=INKEY500
 430 COLOUR 129:COLOUR 3:PR
INT TAB(8,29)SPC(30)
 440 TIME=0
 450 ENDPROC
 460
 470 DEF PROCinitialise
 480 VDU 23,1,0;0;0;0;
 490 sdata=&A00:*FX16
 500 RESTORE 1370
 510 FOR i=0 TO 383 STEP 4
 520 READ a$
 530 i!sdata=EVAL("&"+a$)
 540 NEXT
 550 addr=&50
 560 sprite=&52
 570 FOR i=0 TO 2 STEP 2
 580 P%=&900
 590 [OPT i
 600 .display
 610 LDX #3
 620 .loop1
 630 LDY #63
 640 .loop2
 650 LDA (sprite),Y
 660 STA (addr),Y
 670 DEY
 680 BPL loop2
 690 CLC
 700 LDA addr:ADC #&80:STA
addr:LDA addr+1:ADC #&2:STA
addr+1
 710 LDA sprite:ADC #64:STA
 sprite:LDA sprite+1:ADC #0:
STA sprite+1
 720 DEX
 730 BNE loop1
 740 RTS
 750 ]
 760 NEXT
 770 DIM rule%(8)
 780 RESTORE 800
 790 FOR I%=0 TO 8:READ rul
e%(I%):NEXT
 800 DATA 432,448,216,292,1
86,73,54,7,27
 810 VDU 23,255,170,85,170,
85,170,85,170,85
 820 ENDPROC
 830
 840 DEF PROCscreen
 850 CLS:*FX178
 860 GCOL 0,1
 870 FOR I%=0 TO 1024 STEP
12
 880 MOVE 0,I%:DRAW 1280,I%
 890 NEXT
 900 GCOL0,2:MOVE 0,0:DRAW
0,1023:DRAW 1278,1023:DRAW 1
278,0:DRAW 0,0
 910 PROCwindow(9,4,30,1)
 920 PRINT TAB(5,1);:PROCbi
g("WitchCraft")
 930 PROCwindow(1,29,37,7)
 940 PROCwindow(4,17,15,9)
 950 PROCwindow(23,17,34,9)
 960 PROCwindow(23,25,35,23
)
 970 VDU 26
 980 COLOUR 131:COLOUR 0
 990 PRINT TAB(7,20)" PUZZL
E "TAB(26,20)" TARGET "
1000 COLOUR 129:COLOUR 2
1010 PRINT TAB(9,23)"Q W E"
TAB(9,25)"A S D"TAB(9,27)"Z
X C"
1020 COLOUR 3:PRINT TAB(3,2
5)"Keys:"TAB(19,14)"==>"
1030 ENDPROC
1040
1050 DEF PROCwindow(L%,B%,R
%,T%)
1060 VDU 28,L%,B%,R%,T%
1070 COLOUR 128:CLS
1080 VDU 28,L%+1,B%+1,R%+1,
T%+1
1090 COLOUR 129:CLS
1100 GCOL0,2
1110 MOVE 30+L%*32,992-T%*3
2
1120 DRAW 64+R%*32,992-T%*3
2
1130 DRAW 64+R%*32,960-B%*3
2
1140 DRAW 30+L%*32,960-B%*3
2
1150 DRAW 30+L%*32,992-T%*3
2
1160 ENDPROC
1170
1180 DEF PROCdisplay(B%,I%,
J%)
1190 FOR X%=0 TO 2
1200 FOR Y%=0 TO 2
1210 !addr=&3000+(I%+X%*4)*
16+(J%+Y%*3)*&280
1220 !sprite=sdata+192*((B%
/2^(8-X%-Y%*3))AND 1)
1230 CALL display
1240 NEXT
1250 NEXT
1260 ENDPROC
1270
1280 DEF PROCbig(a$)
1290 FOR I%=1 TO LEN a$
1300 ?&70=ASC(MID$(a$,I%))
1310 A%=10:X%=&70:Y%=0:CALL
&FFF1
1320 VDU 23,225,?&71,?&71,?
&72,?&72,?&73,?&73,?&74,?&74
,225,10,8
1330 VDU 23,225,?&75,?&75,?
&76,?&76,?&77,?&77,?&78,?&78
,225,11
1340 NEXT
1350 ENDPROC
1360
1370 REM Witch
1380 DATA A0D0A0F0,A0D0A0D0
,A050A0F0,B150A050,B351A0F0,
FFFFF773,FFFFF5F0,FFFFFFFF,F
FFEECF0,9FBFFFFF,A050A0F0,FF
FFFFFE,A050A0F0,A0D0A050,B05
0B0F0,B050B050
1390 DATA A0D0A0D0,A0D0A0D0
,F773B151,CFFFFFFF,AD9ECFFF,
F8F8698E,1EF00FFF,F0F03C12,C
3F0F069,F0E1C3C2,FC31FFF,78E
11F01,ECDCA8D8,28DCA8DC,B050
B050,B050B050
1400 DATA A0D0A0D0,F0D0A0D0
,A141A347,F050A050,78F0F078,
F050A134,A5F0F0F0,F00769C2,1
EF0C3B4,F00F3C03,F01ED2B4,F0
0FF01E,C2D2C294,F01CA494,B05
0B050,F050B050
1410 REM Micro Kid
1420 DATA 858285F0,85828582
,50A05F0,377F371B,FF1B05F0,F
FFFFFFF,FFFF77F0,FFFFFFFF,FF
FF8DF0,ED7FFFFF,CD6605F0,A55
EFDEE,50A05F0,850A050A,141A1
4F0,141A141A
1430 DATA 85828582,85828582
,FFFF777F,777FFFFF,ED7F,A5CB
AC4A,60000FF,A5000026,2500A5
5A,A57A5572,13030008,A55A800
0,1020102,C14A4906,141A141A,
141A141A
1440 DATA 85828582,F0828582
,51A153B,F00A050A,A55AA55A,F
00A345A,A549A458,F070A55A,A5
00A55A,F0F0A55A,B45A255A,F00
A8568,582C14A,F00A050A,141A1
41A,F01A141A
```

```
PROCEDURES
screen   Set up the screen display
display  Print the puzzle
window   Draw a window
big      Print double height text
start    Define the variables

VARIABLES
box%     The puzzle
target%  The target
puzzle   Puzzle number
T%       The time remaining
rule%()  The rules
```

Figure II: The control keys



This listing is included in this month's cassette tape offer. See order form on Page 53.

By Pendragon

New releases make a splash

THIS month is the third Top Twenty I have compiled since I took over the cave nearly a year ago, and it is certainly the most interesting.

Only 27 per cent separates the top and bottom positions, and never has an adventure received as high a vote as that achieved by The Lost Crystal.

The marks are an average of all votes sent in since the last chart in June, and it's good to see new releases making such an impression.

The mail I have received praising Dodgy Geezers, The Nine Dancers, Kayleth and Oxbridge has been phenomenal.

I am sure I am not alone in believing the quality of Electron adventures has increased manyfold during the last year.

It is also pleasing that true classics such as Wheel of Fortune, Myorem and Woodbury End remain firmly in the top ten.

With new releases such as Village of Lost Souls, Suds and The Puppet Man yet to have time to make their presence felt, the next Top Twenty in February should be just as absorbing.

TOP TWENTY READERS' VOTES

1	The Lost Crystal	Epic	98%
2	Myorem	Robico	96%
3	Kayleth	Adventure Soft	93%
4	Oxbridge	Tynesoft	92%
5	Dodgy Geezers	Melbourne House	91%
6	Wheel of Fortune	Epic	90%
7	Woodbury End	Shards	89%
8	Rick Hanson	Robico	88%
9	Quest for the Holy Grail	Epic	87%
10	The Ket Trilogy	Incentive	86%
11	Philosopher's Quest	Acornsoft	85%
12	Twin Kingdom Valley	Bug Byte	84%
13	Project Thesius	Robico	83%
14	The Nine Dancers	Larsoft	82%
15	Operation Safras	Shards	81%
16	Sphinx Adventure	Acornsoft	79%
17	Terrormolinos	Melbourne House	76%
18	Ferryman Awaits	Kansas City	75%
19	Fantastic Four	Adventure Soft	74%
20	Classic Adventure	Melbourne House	71%

Last month I mentioned an excellent release by Riverdale Software called Suds. Dave Edwards, the author of this spoof on TV soaps, tells me that at one location, by careful examination, the word Pendragon can be found.

Further to this, he is willing to send the first five readers of this column who discover the location advance copies of Riverdale's next adventure, American Suds.

So come on, adventure buffs – the race is on.

This month I received an interesting booklet helping beginners with Gilsoft's Quill. Anyone interested should write enclosing a stamped addressed envelope, to Alan Davidson, 32c Imperial Drive, Airdrie, Scotland, ML6 9EQ.

While on the subject of stamped addressed envelopes, I have been receiving mail without this necessary prerequisite. My pigeons will not carry replies unless you include one.

And if you are asking for maps or solutions, please make the envelope a large one.

I thank James Elson of Exeter for his fantastic array of maps and complete solution to Twin Kingdom Valley. They are too large and numerous to copy for distribution, but I promise to serialise them once Savage Island has been completed.

Many old adventures are currently available at knockdown bargain prices. For instance, all the old Adventure International and Digital Fantasia series can be bought for less than £3 each from a number of suppliers.

Now is the time to build your collection with classics such as Adventureland and Savage Island before they are deleted, never to return.

One such bargain adventure is the old Melbourne House release, Denis Through the Drinking Glass. It costs as little as £1.50 from some sources.

However, it has come to my notice that there are three different versions, two of them bugged.

If yours crashes when you type I for Inventory or hangs up when you try to SAVE a position, you should return it to the supplier for an immediate replacement.

Last winter, while compiling the Electron Adventure database, I received a complete set of the old Acornsoft adventures.

It seems these are now like gold dust and virtually unobtainable. Many readers have written asking where they can pick up copies of these immortal goodies.

Maybe Superior Software could release an Acornsoft Hits volume containing Philosopher's Quest, Sphinx Adventure, Countdown to Doom and Castle of Riddles. If you think this is a good idea, why not write and let them know.

John Kerr, Jane Forbes and Gary Fisher among others have written claiming to be the first to complete Epic's stunner, The Lost Crystal.

The first full solution I received, however, arrived on April 24th from Robert Henderson of Liverpool. It is the solution I am currently serialising in Hall of Fame.

Congratulations must go to everyone who have completed it – and special thanks to Mark Allen for his set of maps.

Until the keys drop off your Electron, happy adventuring.

electron user

Location guide to

Savage Island

Part One

Location	Description	Objects	Exits	Result
11	Too dark to see	–	–	–
12	Edge of hot, rocky cliff	Crevice	Go crevice	10
13	In a lake	None	Swim	9
			Swim West	14
			Swim down	20
14	West of lake on secluded ledge	Crevice	East	13
			Go crevice	15
15	Edge of cliff	None	East	14
16/17	As 11 – maze	–	–	–
18/19	of caves			
20	Above lake bottom	Watch	Swim East	21
21	Above lake bottom	Block	Swim North	22
22	Above lake bottom	Knife	Swim up	13

Readers Hall of Fame

Enthar Seven *(continued from last month)*

Equip yourself with the spanner, torch, boots, Decibox and Translator. Enter the transportation cubicle and press S1.

You are in familiar territory and can now make real progress. Trace your steps back along the ledge into the misty cavern. Here you should venture NW and S to the grotto, then UP into the alcove. Enter the Twisty maze taking care to LISTEN and follow the song.

Once you have descended to the regular passages, you will soon meet a little man who walks in an anti-clockwise direction. After a one-sided conversation he will exchange a spherical sweet for the pair of boots.

Now go back to the cavern and journey NORTH through the hall of bats, then EAST to discover the Supplies room. The goggles, shovel and mat can be taken and you will now discover a use for the spanner.

If you dig with the shovel in the bat guano you will unearth a diamond. Now go to the transportation cubicle west of the cavern and teleport back to the Command Centre. *(More next month.)*

– The Boss

The Lost Crystal (continued from last month)

The third part is the largest and most difficult. At the start you should blow your whistle to break the window of the mountain door and unbolt it. Now you can retrieve the hammer and monocle.

Go to the rockfall and a secret passage will be revealed. The Priestess is here and she will swap objects with you. Exchange your whistle for a brass key and use this to enter Barnacle Bill's hut where you can take the canoe. Ensure you lock the door on the way out.

Hide the canoe and hammer, return to the Priestess and give her the key. Now go and get the canoe, paddle and hammer and make a sortie past Barnacle Bill's hut. Fill the bottle and drink, then row the boat across the water.

Find the red crystal and wear the cloak to get past the Hydra. The cloak will vanish as you enter the temple. Visit the white crystal room and take the necklace. Now go to the red crystal room and drop the crystal. You are transported back to the caves.

Return to the Priestess and give her your bottle. She will give you a green crystal. Find the mermaid and give her the necklace which she will exchange for a weapon to kill the Hydra.

Go to where you last rowed the canoe and GET BOAT with the sail pole. Row it again and kill the Hydra. Go to the grating, drop the hammer and return to the temple. Drop the green crystal in the green crystal room.

The next bit is quite complex. Go to the Priestess and exchange your arquebus for a white crystal which you must give to the mermaid.

Take the black crystal she gives you, to the Priestess, then give your monocle to the mermaid. You should have received a blue crystal and wooden key in return for your errands.

Get the canoe once again. Go to the temple and open the door with the wooden key. Finally drop the blue crystal in the blue crystal room. *(More next month.)*

– Robert Henderson

◀ From Page 37

Overture & Beginners

The authors of text adventures such as Wheel of Fortune, Classic Adventure and Sphinx ensure the longevity of their masterpieces by inspirational writing and clever puzzle construction. They often add icing to their cakes by confronting you with cunning dead ends.

Only after perhaps, hours of exploration will you realise that a seemingly impossible exit is in fact a doorway to the next part of the game.

In Sphinx Adventure the dead ends are often clever and witty.

I remember geting stuck at the bottom of a rock slide, only to discover after numerous attempts to progress that I needed a magic ring to escape from traps such as this.

However, an even better stymie occurred when I was swallowed by a serpent while trying to cross a lake in a boat.

I imagined for a long time this was a gruesome exit from the game, but later, by chance discovered that striking a match had startling effects.

Recently, while reviewing Suds, I was scratching my head for days on a road blocked by my relations from Emeroyd Farm. I imagined once again this was the author trying to tell me to travel in a different direction.

Only when I realised that progress elsewhere was completed did I try pouring a bucket of concrete to cement relations. Such is the wit of David Edwards, and I was able to finish part one of the adventure.

A more grotesque blockage appeared in The Ket Trilogy. When confronted by a door in mint condition, I tried every method I could find to proceed through the exit to finer riches.

The only clue was a mixed-up loop, which only confused me further. Eventually a reader helped me out, and by saying POLO I created a hole to climb through!

The best dead end I have come across recently, was the wall in the Bogle's cave in The Lost Crystal.

I won't reveal the secret, but maybe you shouldn't sit in the chair.

It just goes to prove we all have blind spots and lateral thinking is an essential skill in opening locked doors.

● *Next month I will begin the adventurer's encyclopedia.*

Problems Solved

Sphinx Adventure and **Twin Kingdom Valley** account for more than one third of my mail.

Such is the quality of these adventures that they still pose problems some four years after they were released.

Dominic Newman asks how to get to the bronze door in **TKV** and J.Parsons wants to know how to meet the princess in the same adventure.

You must proceed west from the Hall of the Forest King, ensuring you are wearing the amulet.

You will soon discover the bronze door, beyond which is the princess who awaits rescue.

Gareth Jones needs to say Diaxos to open the safe in Sphinx Adventure, while John Pidgeon should travel S, S, N, E, W, S, D ,D, U from the bear's cave to find the boat. In Micropower's **Adventure** the magic words are Open Sesame.

Rosemary Wooldridge should DIG, DROP BEAN, DROP WATER for some magical results in Softek's **Eye of Zoltan**. Does anyone know where I can get a copy of this adventure?

Meanwhile Lee Hancock is stuck at the start of Larsoft's **Rising of Salandra**. You must SHOUT or THROW STONE to scare the jackdaw, then enter the cave and journey E, S, GET KNIFE, N, E, E.

Finally, in answer to Stuart Cooper's plea, the vicious dog in **Castle of the Skull Lord** should be hit with something it likes.

10 LINERS

SQUASH

MICRO squash is a single player Electron version of the two player game of the same name and was written by David Harrington. The idea is to keep bashing a ball against a wall for as long as possible without losing it.

Each time you hit it you score a point and your bat moves up the screen. The more points you gain, the further the bat moves and the harder the game becomes.

In addition there are three difficulty levels to select from. These alter the speed of the ball and the size of the bat.

The controls are: Z to move left and X to move right.

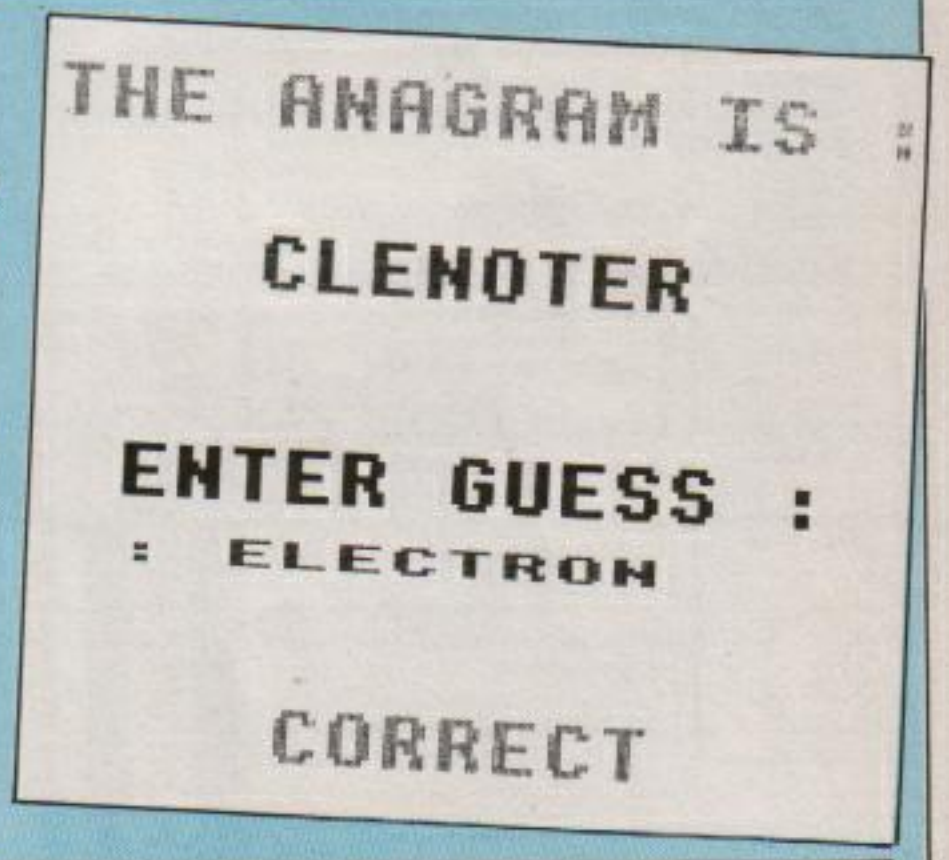
```
    1 MODE 5:VDU 23,255,24,6
0,126,255,255,126,60,24,23,1
,0;0;0;0;:PRINT TAB(5,11)"So
lo Squash"" By David Harri
ngton":COLOUR 2:PRINT TAB(2,
16)"Select Difficulty"TAB(8,
17)"Level"TAB(3,19)"1(hard)-
3(easy)":REPEAT D%=GET-48
    2 UNTIL D%>0 AND D%<4:CL
S:COLOUR 130:PRINT'STRING$(1
9," "):FOR y%=1 TO 28:PRINT
TAB(19,y%)"  ":NEXT:VDU 8,32
:COLOUR 128:PRINT"Score:0"T
AB(11)"Lives:3";:batx%=10:ba
ty%=28:L%=3:S%=0:*FX16
    3 bx%=10:by%=2:my%=1:mx%
=1:REPEAT batx%=batx%-(INKEY
-67 AND batx%<(19-D%))+(INKE
Y-98 AND batx%>1):PRINT TAB(
1,baty%)SPC(18):COLOUR 129:P
RINT TAB(batx%,baty%)SPC(D%)
:COLOUR 128:PRINT TAB(bx%,by
%)" "
    4 bx%=bx%+mx%:by%=by%+my
%:IF bx%<1bx%=1:mx%=1:SOUND
1,1,80,1 ELSE IF bx%>18 bx%=
18:mx%=-1:SOUND 1,1,80,1
    5 IF by%=baty% GOTO 9
    6 IF by%<2 by%=1:my%=1:S
OUND 1,1,50,1:by%=2
    7 COLOUR 3:PRINT TAB(bx%
,by%)CHR$255:UNTIL baty%=2
    8 PRINT TAB(5,12)"Well d
one!"TAB(5,14)"You've won"TA
B(2,16)"Hit R to restart":RE
PEAT UNTIL INKEY-52:RUN
    9 IF POINT(bx%*64,(31-by
%)*32)=1 S%=S%+(29-by%):COLO
UR 2:PRINT TAB(6,31)STR$(S%)
;:by%=baty%-1:my%=-1:PRINT T
AB(1,baty%)SPC(18):baty%=bat
y%-1:SOUND 1,1,100,1:GOTO 6
ELSE FOR note%=50 TO 10 STEP
-2:SOUND 1,1,note%,1:NEXT
    10 L%=L%-1:batx%=10:COLOU
R 2:PRINT TAB(17,31)STR$(L%)
;:PRINT TAB(1,baty%)SPC(18):
baty%=28:IF L%>0 GOTO 3 ELSE
 COLOUR 3:PRINT TAB(5,15)"Ga
me over"TAB(1,17)"Press R to
 restart":REPEAT UNTIL INKEY
-52:RUN
```

ANAGRAMS

THIS two player contest by David Taylor is a simple anagram guessing game.

When it is run you'll be prompted for a word. One player types it in while the other isn't looking, the Electron scrambles it and prints the anagram. The other player must now guess the word.

Although the listing is fairly simple, there is a useful double height print routine which can be used in your own programs.




```
    1 MODE5:DIM WD$(20),N%(2
0):VDU19,1,5;0;19,3,6;0;:COL
OUR1:PRINTTAB(6,0);:PROCbig(
"ANAGRAM"):COLOUR2:PRINTTAB(
0,4);"ENTER A WORD":COLOUR3:
INPUTTAB(0,10);": "W$:L%=LEN
(W$):CLS:FOR A%=1 TO L%:WD$(
A%)=MID$(W$,A%,1):NEXT
    2 FOR B%=1TOL%
    3 R%=RND(L%):IF N%(R%)=1
 PROCCH:IF G%=1 THEN 3
    4 N%(R%)=1:WRD$=WRD$+WD$
(R%):NEXT:IF WRD$=W$ FORC%=1
TOL%:N%(C%)=0::NEXT:WRD$="":
GOTO2
    5 COLOUR1:PRINTTAB(2,0);
:PROCbig("THE ANAGRAM IS :")
:COLOUR2:PRINTTAB((19-L%)/2,
8);:PROCbig(WRD$)
    6 COLOUR3:PRINTTAB(0,18)
;:PROCbig("ENTER GUESS :"):C
OLOUR2:INPUTTAB(0,21);": "G$
:COLOUR1:IF G$=W$ PRINTTAB(6
,27);:PROCbig("CORRECT") ELS
E PRINTTAB(6,27);:PROCbig("W
RONG"):COLOUR2:PRINTTAB((19-
L%)/2,8);:PROCbig(W$)
    7 T$=INKEY$(200):CLS:PRI
NTTAB(1,10);:PROCbig("ANOTHE
R GO (Y/N) ?"):REPEAT:A$=GET
$:UNTILA$="Y"ORA$="N":IF A$=
"Y" THEN RUN ELSE MODE6:END
    8 DEFPROCCH:G%=0:FORA%=1
TOL%:IF N%(A%)=0 A%=LEN(W$)
    9 NEXT:G%=1:ENDPROC
   10 DEFPROCbig(A$):FORI%=1
TOLEN A$:?&90=ASC(MID$(A$,I%
,1)):A%=10:X%=&90:Y%=0:CALL&
FFF1:FORJ%=0TO1:VDU23,255:FO
RK%=2TO9:VDU?(&90+4*J%+K%DIV
2):NEXT:VDU255,10,8:NEXT:VDU
11,11,9:NEXT:ENDPROC
```

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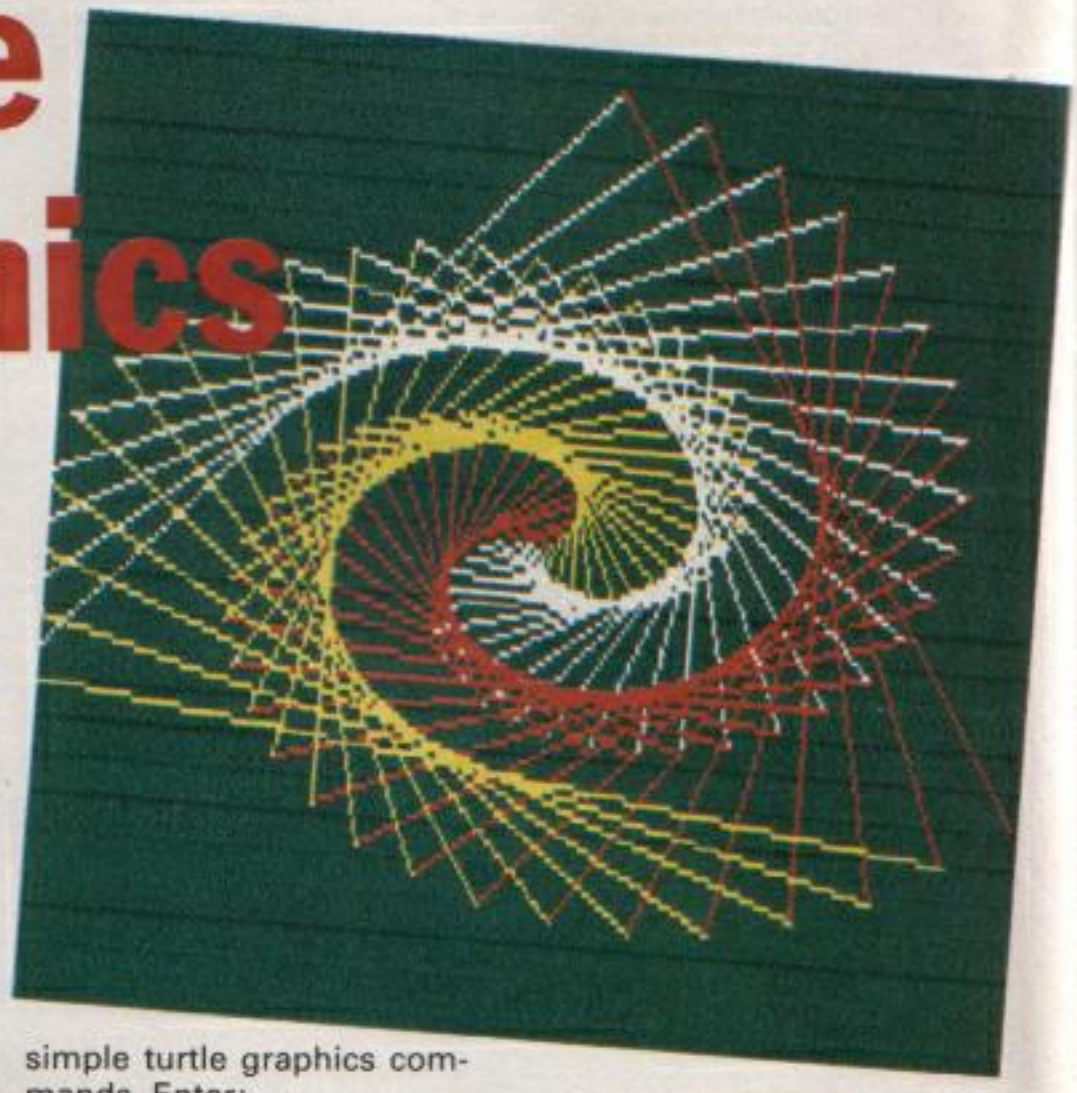
Turtle graphics

ROLAND WADDILOVE introduces the programming language Logo



LOGO is a fairly new language, less than 10 years old, developed by Seymour Papert, a mathematics professor at the Massachusetts Institute of Technology.

He investigated how children learn and how computers could help them. Logo was intended to provide the ideal learning environment.

It has been, and still is in widely used in schools, particularly in primary education where children are taught simple geometry through using a turtle or buggy combined with Logo's simple turtle graphics commands.

Unfortunately the educational history of Logo's development has had the effect of labelling the language a child's toy.

Most people are only aware of the turtle graphics side of the language, and this tends to strengthen the misapprehension.

It is far from being a toy and is in fact a powerful programming language which has many applications as we'll see in this short series.

With the exception of turtle graphics, Logo is far from easy to learn and is probably more difficult to get to grips with than Basic.

Some aspects of the language are similar to Lisp, so if you've been following this series you should recognise some of the list processing commands.

I'm going to start on familiar territory by first looking at turtle graphics. Once this is out of the way we can concentrate on the more unusual and little known aspects of Logo.

There is only one full implementation of Logo for the Electron – the Acornsoft rom cartridge. This is currently selling for less than £30 and comes complete with two thick manuals.

Alternatively, a cut down version comprising the turtle graphics commands is available from Acornsoft and is a good introduction to the language. It sells for under £3 and comes on cassette.

If you don't mind typing you'll find a Logo lookalike called Pogo in the December 1986 and January 1987 issues of *Electron User*.

For this article I'll assume you have Turtle Graphics up and running and are sitting at your Electron ready to type in the examples.

Like Basic, Logo uses a text window to display text output and a graphics window for graphics. The startup screen is a SPLITSCREEN with a graphics window at the top and text window at the bottom.

There's also a TEXTSCREEN for displaying text only and a FULLSCREEN for graphics only. To see these enter:

```
TEXTSCREEN
FULLSCREEN
```

and finally, typing "blind":

```
SPLITSCREEN
```

You can't see what you're typing after entering FULLSCREEN because it's designed for graphics only. SPLITSCREEN however, restores everything to its initial state.

This screen is useful for entering direct commands and watching their effects as we'll see. Shortly, we'll use a TEXTSCREEN to enter and edit a procedure.

Let's try a few of Logo's simple turtle graphics commands. Enter:

```
FORWARD 200
```

and you'll see the turtle (represented by the triangle in the centre of the screen) move forward 200 units leaving a trail behind it.

The turtle's units are the same size as the graphics units you're used to in Basic and the screen is 1280 units wide and 1024 high.

Now turn the turtle with:

```
LEFT 90
```

and follow it with another:

```
FORWARD 200
```

The 90 is the number of degrees to turn and the LEFT is which way – left or right. We can turn the turtle trail into a square with:

```
LEFT 90
FORWARD 200
LEFT 90
FORWARD 200
LEFT 90
```

We can just as easily draw a triangle. First clear the screen with CLEAR and then type:

```
FORWARD 200
LEFT 120
FORWARD 200
LEFT 120
FORWARD 200
LEFT 120
```

Notice this time we turned through 120 degrees each time. There are 360 degrees in a circle so if we turn through a total of 360 degrees we'll end up facing the way we were at the start.

To draw a three sided polygon (a triangle) we turn through 360/3 or 120 degrees each time we draw a side. To draw a four sided polygon (a square) it's 360/4 or 90. A pentagon has five sides so we could draw one by entering:

```
FORWARD 200
LEFT 72
```

five times (72 is 360/5). Try it and see – clear the screen with CLEAR first though.

You now know how to draw any polygon. Simply divide 360 degrees by the number of sides and turn that number of degrees each time you draw a side.

You must have noticed by now, how repetitive the commands are. What we've been doing is repeatedly telling the turtle to go forward 200 units and turn left a set number of degrees, many times.

Naturally, there is a REPEAT command in Logo which enables us to repeat a section of code. To use it

however, we'll need to define a procedure. This means using the built-in text editor.

We'll use the TEXT-SCREEN to define the procedure so enter:

```
TEXTSCREEN
```

Now tell Logo we want to define a procedure with:

```
TO SQUARE
```

and the message "Type M for Menu or type an edit command" followed by "Add lines" appears. Forget the menu, Logo is waiting for you to enter the procedure definition. Here it is:

```
SPLITSCREEN
REPEAT 4
 FORWARD 200
 LEFT 90
ENDLOOP
```

We tell Logo we've finished by typing:

```
STOP
```

and the M for Menu message appears. Press M now to see the editor's commands.

Tap the L key and you'll see the procedure you've just defined listed on the screen, it should look like Figure I. If there are any errors, use the replace line command to enter the offending line again.

Assuming all is well, press E to end the editing session. Now we can test our procedure. Type:

```
SQUARE
```

and you should see the turtle draw a square. Logo repeats the section of program between the REPEAT and ENDLOOP markers four times – the number immediately following the REPEAT command.

If we wanted to draw a hexagon – a six sided polygon we would repeat the loop six times and the angle to turn left each time would be 60 degrees (360/6).

If you have followed everything so far, try defining another procedure called BOX and in place of FORWARD enter BACK instead, and replace LEFT with RIGHT. After defining it, enter BOX to run it.

What we've got is a procedure that draws a square of fixed size. It would be nice if we could draw it any size we want.

Change to the TEXT-SCREEN and type LIST to see what procedures have been defined – there should be two, SQUARE and BOX. Delete them with:

```
ERASE SQUARE
ERASE BOX
```

or alternatively use NEW to clear the memory. Define a new procedure called rectangle:

```
TO RECTANGLE width,height
```

The two variables *width* and *height* are two parameters we are going to pass to the procedure. The main body of the definition is:

```
REPEAT 2
 FORWARD width
 LEFT 90
 FORWARD height
 LEFT 90
ENDLOOP
STOP
```

Remember the STOP ends the procedure definition and doesn't mean stop the program.

To test this enter:

```
SPLITSCREEN
RECTANGLE 100,500
```

If you have entered it correctly you should see a large rectangle drawn on the screen. We'll embed this definition within another and use it to generate a pattern.

```
Type:
A to Add lines
L to List procedure
D to Delete a line
I to Insert a line
R to Replace a line
C to Change the identifier list
E to End edit

List procedure
PARAMETER(S):
None
PROCEDURE IDENTIFIER(S):
None

1     SPLITSCREEN
2     REPEAT 4
3      FORWARD 200
4      LEFT 90
5     ENDLOOP
6     STOP

Type M for Menu or type an edit command
```

Figure I: The editing screen

Change to the TEXT-SCREEN and enter:

```
TO PATTERN steps
SPEED 255
SPLITSCREEN
REPEAT steps
 RIGHT 360/steps
 RECTANGLE 300,100
ENDLOOP
STOP
```

This defines a procedure called PATTERN which takes one parameter, *steps*. The first command, SPEED sets the speed of the turtle to fast – it ranges from 1, slow to 255, fast.

Notice the REPEAT loop is dependent on the parameter *steps*, and the angle to turn is an arithmetic expression. RECTANGLE is called from within the REPEAT loop.

Test this new procedure with:

```
PATTERN 4
PATTERN 30
HIDETURTLE
PATTERN 60
```

and see what happens. Here is a spiral pattern using the rectangle procedure again, enter:

```
TO SPIRAL
SPLITSCREEN
HIDETURTLE
SPEED 255
x:=400
y:=300
REPEAT
 WHILE y>10
 RECTANGLE x,y
 x:=x-10
 y:=y-10
 RIGHT 10
ENDLOOP
STOP
```

In this, two variables *x* and *y* are used. Note that := is used to assign a value to them and not = as in Basic.

The REPEAT loop is different in that it isn't repeated a set number of times, but loops WHILE *y* is greater than 10.

To see what procedures you've got in memory switch to the TEXTSCREEN and type LIST. To see a particular procedure definition follow LIST with its name. To change it type EDIT followed by the procedure name.

● *That's all for now. Next month we'll leave turtle graphics behind and look at the rest of the Logo programming language using the rom cartridge.*

BACK number	PENERASE
CLEAR	PENUP
COLOUR number	PRINT number/text
EDIT procedure	RAND variable
ERASE procedure	REPEAT
ENDIF	REPEAT number
ENDLOOP	RETRIEVE name
ENVELOPE n,n,n...	RIGHT number
FILL	SAVE name
FORWARD number	SETTURTLE n,n,n
FULLSCREEN	SHOWTURTLE
GET	SOUND n,n,n,n
HIDETURTLE	SPEED number
HOME	SPLITSCREEN
IF expression	TEXTSCREEN
LIST	TO name
LIST procedure	TURTLESTATE n,n,n
LEFT number	UNTIL expression
MODE number	VDU n,n,n...
NEW	WHILE expression
PENDOWN	

Table I: Turtle Graphics commands

electron user ARCADE CORNER

What can you say about computer games? Almost everyone has a particular favourite, whether as five minutes relaxation after a hard day's wordprocessing, or as a full-scale obsession. Hands up those of you still playing Elite!

Of course, no matter how good your favourite game may be, it is never configured precisely to your taste – it may be too easy or too hard. It is possible, however, to tailor it to your ideal requirements.

Compilations – without doubt the flavour of the year – give ample scope for tinkering. The Superior Collection is one of the best. It consists of seven favourite Superior Software oldies, together with a previously unreleased game.

This month we feature cheats and pokes for Smash and Grab, Deathstar, Mr Wiz and Overdrive – four of the games contained in this collection.

Share your hints, tips, peeks and pokes with fellow *Electron User* arcade addicts (but please ensure they are all your own work). Send them to:

Arcade Corner
Electron User
68, Chester Road
Hazel Grove
Stockport
SK7 5NY

***Deathstar** – Superior Software*

Deathstar is a conversion of the arcade game Sinistar where you are the pilot of a solitary mining spaceship in search of crystals.

Shoot the planetoids to release them, then scoop them up. Once collected they act as bombs.

Competing with you are the Worker ships which use the crystals to assemble, piece by piece, the dreaded Deathstar. Defending these Workers are Warrior ships that shoot at you at the slightest provocation.

To make yourself invulnerable to the bullets of the Warrior ships, enter the following:

```
PAGE=&3000
LOAD"DEATH"
155 END
RUN
```

Put the tape in the tape recorder and press Play. Wait until the files DEATH1 and DEATH2 have loaded, then type:

```
LOAD"DEATH3"
8 ?&1397=0:?&1A21=0
RUN
```

You can give yourself a little more breathing time with:

```
8 ?&1386=0:?&18F3=0
```

This causes the Deathstar to be rebuilt from scratch every time it kills you.

The two sets of pokes can, of course, be combined as a single line.

***Smash and Grab** – Superior Software*

Smash and Grab is a basic platforms and ladders game, and one that teaches very bad habits.

You are a bank robber out to get rich quick by collecting the bags of gold falling from a bank's broken window.

In your way stands the local bastion of the law, but beware, he's mean.

Not only can he run faster than you, but he also has a nasty habit of jabbing you from below or bopping you on the head from above with his truncheon.

As attack is always the best form of defence, wait until a police box starts to flash, then kick it.

This gives you a limited period of invulnerability. You can then attack the policeman and knock him into the water

I'm not sure it's altogether acceptable to go around assaulting policemen, but it's a fun game anyway.

It is however, somewhat marred by being extremely slow – none of the fast, smooth action you would expect from a fairly recent release.

As the game stands, you start on level zero with three lives. To start on level one with an extra life enter the following:

```
PAGE=&5800
LOAD"SMASH2"
675 ?&14F3=1
RUN
```

Overdrive – *Superior Software*

Overdrive is unfortunately a classic example of a game showing its age. You control a motor racing car driving through a series of stages, including desert and night drives.

Seemingly out to get you are a number of other competitors whose driving makes Parisian taxis seem tame.

Sadly, Overdrive falls short of what both Peter Johnson and the Electron are capable of, though in its time it was considered to be an excellent game.

For those struggling, you can make the game easier by entering the following:

```
PAGE=&2300
LOAD"OVER2"
210 IF ?BONUS%>20 THEN ?STA
GE%=?STAGE%+1:GOTO 150
RUN
```

The sound envelopes will be lost, but you now need to pass only 20 cars to be promoted to the next stage.

By all means change line 210 – the qualifying limit can be anywhere between one and 50.

Psychastria – *Audiogenic*

To activate Psycastria's built-in cheat, wait until the second file, PSYCASTRIA, has almost finished loading and then hold down the Shift key.

After a few seconds, the computer will bleep at you and print the message "CHEAT PRIMED!". Release Shift and wait until the game has finished loading.

On the title page, press down the keys I, L, T, D and N together. The program will then ask you for a password: Type in SHOTOKAN. When you play the game you will have 123 lives instead of the usual three.

After each game the program reverts to normal, so enter the password again to cheat next time round.

Mr Wiz – *Superior Software*

Mr Wiz is a version of the arcade favourite, Mr Do, a game that has robbed me of more 10p pieces than I care to count. You are a wizard who must run around the garden collecting cherries.

The garden is also inhabited by a number of hungry creatures who like nothing better for lunch than a tasty bit of wizard.

By careful timing you can squash them under the numerous giant apples. Life isn't so easy though and they have a habit of avoiding your carefully laid traps, so it's a good job you remembered your trusty crystal ball which you can throw at them.

Unfortunately, Mr Wiz does not stand up too well beside Mr EE from Micro Power, but that title is sadly only available for the BBC Micro.

To start on a higher level in Mr Wiz (up to 99) or have extra lives (up to 41) enter the following:

```
PAGE=&2100
LOAD"GAME"
12 Q%=5402:E%=5495:M%=5638:
L%=6947:R%=5952
125 !&14B6=start level:?&1
4BA=no of lives
RUN
```

Unfortunately, the sound envelopes will be lost, but the extra versatility should make up for this.

Sphere of Destiny – *Audiogenic*

Gary Partis' games, Sphere of Destiny and Psychastria have built-in cheats. To activate Sphere of Destiny's, wait until the game has finished loading, and then press the 0 key.

In response to the computer's prompt, enter the password LAZONNOMORE. The black holes will be filled in white making the game considerably easier. Pressing J will advance you to the next level.

After each game the program reverts to normal, so enter the password again to cheat next time round. Thanks to Justin Condon from County Dublin and Paul Sanderson from Chesterfield for this excellent tip.

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"AP4 should be considered the standard interface for the Electron (AU July '86)
AP4 100 £199.00 (inc VAT & Securicor delivery)
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Micro Messages

The Electron's role in education

THANK you for Nic Outterside's new series on the Electron in education. As the school's resident expert it has been my job to guide the school through the last three years, and this term, to replace our Electrons with the BBC Micro.

With all due respect to Nic, he has only stated half of the problem. True educational software stockists are few and far between (but what's wrong with buying direct anyway?).

The main problem, which we all know but are loath to admit, is the Electron's lack of memory.

From the very beginning, the usual gripe was "But it doesn't have Mode 7". As most companies wrote their programs in Mode 7, this cut the Electron user off from a vast source of quality software.

Knowing this, I recommend the Electron on the basis chiefly of cost to our parents.

Hitherto the teacher such as myself faced by this question had two choices. Option one is said at normal speed: "Well, you can buy an Electron for about £80 and a tape recorder for another £30, but you won't be able to buy some of the better BBC software". You then walk away.

Option two is said rather more quickly: "Well, you can get the BBC Micro and it'll cost you at least £300, that's without a tape recorder or disc drive or software".

Having delivered this well measured discourse you run like hell before the parents have worked out what this will all cost them.

With the recent addition of Mode 7 emulators the Electron has now come back into its own. It is now possible to run BBC software on a machine which has cost no more than £200.

This is surely where the Electron's future lies. – **Chris Price, Sidcup, Kent.**

● We always emphasise that no matter what you add to an Electron it will never be a BBC Micro. The Electron is a totally different computer, and it is amazing that it runs any BBC software at all.

You can save programs on an Electron disc, put it in an Archimedes, load and run them. Try running Spectrum software on Sinclair's latest Z88, or Atari 800 software on a Mega ST or. . . the list could go on.

Techniques learnt on the humble Electron will stand you in good stead when moving on to a much more powerful micro such as a Master Compact or Archimedes. No other micro (or company) provides this degree of compatibility.

The lack of memory can be solved by adding Slogger's Master Ram Board (reviewed in the January 1987 issue of *Electron User*) or a PMS second processor (reviewed in the October 1986 issue).

The lack of Mode 7 can be overcome with Jafa Systems' Mode 7 adapter (reviewed in the August 1987 issue).

As to the software problem, how about asking some of the older students to write educational software for the younger pupils lower down in the school?

It could easily become a useful project for A level students, and it will benefit the school and parents as well.

In shadow mode

IN the August 1987 issue of Electron User *a letter by Adrian Trout highlighted the problems of accessing screen memory using Slogger's Master Ram Board in shadow mode.*

The solution you printed is fine for saving screen memory to disc, but is rather slow – even when converted to machine code this is still the case.

Several of my programs use pull down menus that require the screen memory to be acessed both directly and quickly. I thought I had the answer when I discovered that writing a one to location &FC7F paged out the shadow memory.

As well as doing this however, all memory below &3000 was paged out also, so the stack and zero page vanished.

It is possible to write a machine code program using this technique, but the resultant program is very inelegant and since all memory between 0 and &7FFF is paged out, the program must reside above &8000 that is, in sideways ram.

Hot on the heels of this discovery I noticed that changing from shadow to turbo modes paged out memory above &3000 and only this memory – just what was needed.

However, this meant my programs contained messages like "Switch to Turbo mode" and so on. If this method is used the program to do the saving must be in machine code and must reside below &3000 since the Basic stack is paged out.

In my quest for the ultimate solution I realised that automatic operation of the mode switch was called for. Of the three wires going to the mode switch the centre one carries +5V while the others are:

● *Normal, shadow or turbo mode select: When this line is at +5V normal mode is selected. Disconected, shadow or turbo mode is selected.*

● *Shadow or turbo mode*

Turn to Page 48 ▶

BUSY AS A BEE

Computing's my main aim in life,
Not being a chef with a carving knife,
Or down in the pits, mining for coal,
Or wandering around, 'cause I'm on the dole.

It's a busy life at the keyboard,
By the memory, where programs are stored,
So much to try, so much to do,
There's hardly time to nip to the loo!

When at last your fingers grow tired,
You pull out the plug, the Electron's unwired,
It's time to get a good night's rest,
Dreading tomorrow's computer test.

Neil Parrish, (age 12), Bessacarr, Doncaster.

◀ From Page 47

select: When this line is at +5V, Turbo mode is selected. Disconnected, shadow mode is selected. Note that "disconnected" is really 0V due to pulldown resistors on the board.

Therefore all that is required is an output port with one bit connected to shadow/turbo select. If bit one is used, writing one to the port will select turbo mode, writing zero will select shadow mode.

It has occurred to me however, that since most Master Ram Board users will also be disc users, at least when using shadow mode, then the cassette relay could be used instead.

This would have to take into account contact bounce – employ a short delay after switching before any memory is accessed, and also have a manual overide to allow turbo mode to be selected for games when the cassette interface is being used.

Another alternative would be to use one of the outputs from port A of a 6522 VIA available on most user port addons. I think Slogger should have had this form of mode selection rather than the switch.

While on the subject of the Master Ram Board I have found a minor bug in its operating system. When an OSCLI command string is in memory above &3000 and parameters are required, a Bad command error is produced. This only applies to inbuilt commands, not for instance, to DFS commands.

I have quite an early Master Ram Board, the os being version 2.00 so the bug may have been cured by now. Apart from this I consider the Master Ram Board to be the best add-on available for the Electron bar none. – ***Brian Ross, Glasgow.***

● We have a Master Ram Board fitted with version 2.00 of the operating system, but were unable to reproduce the error messages you describe.

ALL programs printed in this issue are exact reproduction of listings taken from running programs which have been thoroughly tested.

However on the very rare occasions that mistakes may occur corrections will be published as a matter of urgency. Should you encounter error messages when you type in a program they will almost certainly be the result of your own typing mistakes.

Unfortunately we can no longer answer personal programming queries concerning these mistakes. Of course letters about suggested errors will be investigated without delay, but any replies found necessary will only appear in the mail pages.

Literate leanings

I WELCOME the appearance of the new feature Arcade Corner, but at the same time the argument of your correspondent Tim Walter may not be as soundly based as all that.

The point is not how popular arcade games are in general as compared with adventures, but how they are ranked by readers of the magazine. This isn't the same thing.

My guess would be that the more literate a person is, the more he reads, the more likely he is to lean towards adventures. But I am willing to be proved wrong. – **Bill Trevelyan, Epsom, Surrey.**

● In our experience this simply isn't true. The editor, for instance, likes nothing better than a good shoot-'em-up and hasn't the patience to play an adventure.

All top programmers are extremely clever, literate people, yet they mostly write arcade games, not adventures.

Apostrophe catastrophe

I ENJOY typing in the listings and attempting to make them work (what a feeling when they do!). Unfortunately, I am now over 40 and my eyesight is not as good as it was and certain aspects of your listings are beginning to cause difficulty.

I find it impossible to distinguish between inverted commas and apostrophes. As an example, take line 2580 in the Lemonade Stall listing in the September 1987 issue of Electron User. *I cannot get the right combination to run the program.*

Perhaps wide gaps between apostrophes might solve the problem. Whatever it is, please let me have the correct line for 2580. – **Peter Crawforth, Ferryhill, Co Durham.**

● This is quite a difficult line to understand because of the large numbers of quotes – there aren't any apostrophes.

You can print quotes in a string using the double quote "" like:

```
PRINT "Tom said ""Hello""."
```

This will print:

```
Tom said "Hello".
```

on the screen. Note that Basic interprets the double quote with nothing in between as meaning a single quote within the text.

This is what line 2580 is doing and PROCmsg starts:

```
PROCmsg(""+STR$...
```

This is a double quote inside two single quotes and will print as a single quote on the screen. The procedure also ends with the same single-double-single quote.

Not only is it confusing on paper it is also confusing on screen as well. An alternative would have been to use:

```
PROCmsg(CHR$(34)+STR$...
```

where CHR$(34) is the quote character. We'll try to watch out for this in future and use the alternative form wherever possible.

It's all a plot

IN the March 1986 issue of The Micro User, *the Body Building article made use of an assembly language routine that plotted lines directly to the screen.*

However, I found the explanation a little sparse, and the March 1984 issue, where I understand the technique is fully explained, is unavailable.

Would it be possible for you to explain this undoubtably useful technique in an article, maybe with some of the other common assembly language problems such as printing numbers and floating point variables? – **J. Rabone, Wirral, Merseyside.**

● You'll find a full explanation of floating point variables and machine code maths in the September 1987 issue of *Electron User.*

Printing hexadecimal numbers is quite easy:

```
10 REM Hex print routine
20 FOR i=0 TO 2 STEP 2
30 P%=&900
40 [ OPT i
50 .hexprint
60 PHA
70 LSR A
80 LSR A
90 LSR A
100 LSR A
110 JSR digit
120 PLA
130 .digit
140 AND #&0F
150 SED
160 CLC
170 ADC #&90
180 ADC #&40
190 CLD
200 JMP &FFEE
210 ]
220 NEXT
230 INPUT "Number(0-255):"A%
240 CALL &900
250 RUN
```

Printing decimal numbers

is slightly more difficult:

```
 10 REM Decimal print
 20 number=&70
 30 digits=&72
 40 zero=&73
 50 FOR i=0 TO 2 STEP 2
 60 P%=&900
 70 [ OPT i
 80 LDY #0
 90 STY zero
100 LDA #4
110 STA digits
120 .loop
130 JSR sub
140 INY:INY
150 DEC digits
160 BNE loop
170 .sub
180 LDX #ASC"0"-1
190 .loop
200 INX
210 SEC
220 LDA number
230 SBC table,Y
240 STA number
250 LDA number+1
260 SBC table+1,Y
270 STA number+1
280 BPL loop
290 CLC
300 LDA number
310 ADC table,Y
320 STA number
330 LDA number+1
340 ADC table+1,Y
350 STA number+1
360 CPX #ASC"0"
370 BNE here
380 LDA zero
390 BNE here
400 RTS
410 .here
420 TXA
430 INC zero
440 JMP &FFEE
450
460 .table
470 EQUW 10000
480 EQUW 1000
490 EQUW 100
500 EQUW 10
510 EQUW 1
520 ]
530 NEXT
540 INPUT "Number";N%
550 !number=N%
560 CALL &900
570 PRINT
```

Drawing lines and plotting points is more complex still and we haven't the space here to list a suitable routine. We have some articles planned on this topic for early next year.

Adventure writer

I HAVE had an Acorn Electron for three years and have noticed that the range and quality of software available is rapidly improving.

As well as playing games, a lot of my time spent on the computer is devoted to programming, which I find extremely enjoyable.

I have, however, come across one very annoying aspect of writing adventure games – the long detailed text and complex graphical locations take up so much of the Electron's memory it is easy to run out.

I was pleased to see in the July 1987 issue of Electron User, *that Mark Smiddy revealed a clever method which was able to cram up to 200 different Mode 2 screens on one disc.*

I was very impressed indeed by this method, because I had always wondered how an adventure game I have, called Twin Kingdom Valley, had managed to include so many Mode 2 screens.

While programming, occasionally type:

```
PRINT TOP-PAGE
```

and a number will be printed indicating how many bytes of memory the program occupies.

I have found that approximately 8400 is about the time to stop and finish the adventure otherwise when you run it you'll get a Bad mode error message.

One way to cut down on the memory used is to leave out unnecessary spaces between commands, or simply use short descriptions where possible. Can you suggest any other helpful methods? – **S. J. Champion, Brentwood, Essex.**

● Twin Kingdom Valley draws its pictures in Mode 5 and switches to Mode 6 for the text. This gains an extra 10k of memory over a Mode 2 program.

The extra colours used for painting shapes are generated by using a clever technique called dithering. If you plot adjacent pixels in different colours they merge and produce a new one.

Loads of problems

I HAVE found Micro Messages a very interesting and helpful part of Electron User. *Can you explain something that is puzzling me?*

I have not had much experience of disc usage, but recently bought a Watford Electronics drive and an ACP Plus 4.

*If I load a program from disc with *LOAD and then run it I get the message "Syntax error at line 10" followed by "Bad program". Line 10 is a REM statement and is the first line.*

*If I *LOAD the program then list it on the screen however, I get the correct listing. Then RUN will execute the program normally.*

I have been unable to find any reference to this in the literature I have, and would be interested to hear an explanation. – **J.D.Bower, Thorbumbald, Hull.**

● You should treat the disc system just like a tape recorder. So to load a Basic program simply LOAD it – don't use *LOAD.

Alternatively, you can CHAIN it which loads then runs it automatically. You should not *LOAD a Basic program without either listing it or typing OLD as Basic gets very confused and reports an error.

Machine code and pure data files should be *LOADed. To find out whether a file is Basic or machine code use:

```
*INFO *.*
```

to print out the load, length and execution addresses. The name of each file is printed followed by four hexadecimal numbers.

The first is the load address – which should end E00 with a Plus 4. The second is the execution address – ending 8023 for Basic programs. The third is the length of the file and the fourth is the disc address.

An execution address ending 8023 indicates the file is Basic and you can either LOAD or CHAIN it.

Spelling checker required

IN the August 1987 issue of Electron User *G.Crawford asked for ideas about differentiation on the Electron.*

Acornsoft used to publish a package of four programs called Algebraic Manipulation. These included programs to differentiate and integrate algebraic expressions typed in.

I don't know if this is the type of thing Mr Crawford is looking for, but even if it isn't, the programs were written in Basic and it should be relatively easy to adapt procedures from them and incorporate them into his own programs.

I would like to use the Acornsoft spelling checker, Viewspell, on my Electron. My major worry is getting a copy of the dictionary disc that is compatible with my Plus 3.

I know Acorn sell a version for the Master Compact on 3.5in ADFS disc. Can I load the rom image from this disc into sideways ram or second processor memory and run it from there? If so, is the Compact version compatible with the Electron? – **Neil Hoggarth, St. Cross, Winchester.**

● Thank you for the help with our algebra. We weren't aware Acorn produced such a package for the Electron.

We haven't tried the Master Compact version of Viewspell on the Electron, but doubt whether it will work. The disc is quite likely to be double sided for starters.

If you want to start doing more with your micro than just playing games, this package is your ideal introduction to the four most popular applications for professional computers. All the programs have been designed for simplicity, so even a child can use them. Yet they include advanced features not yet available on programs costing many times as much!

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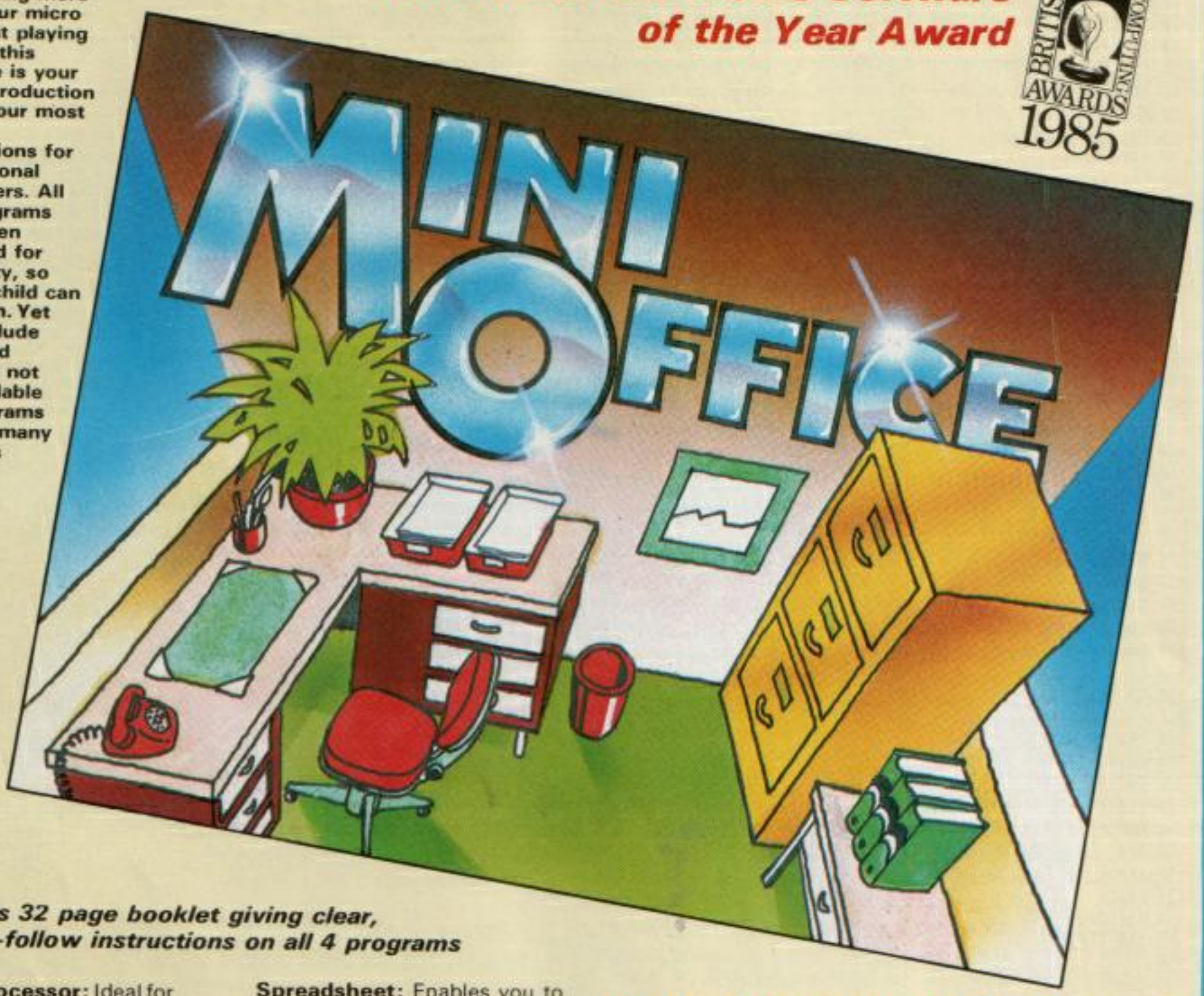

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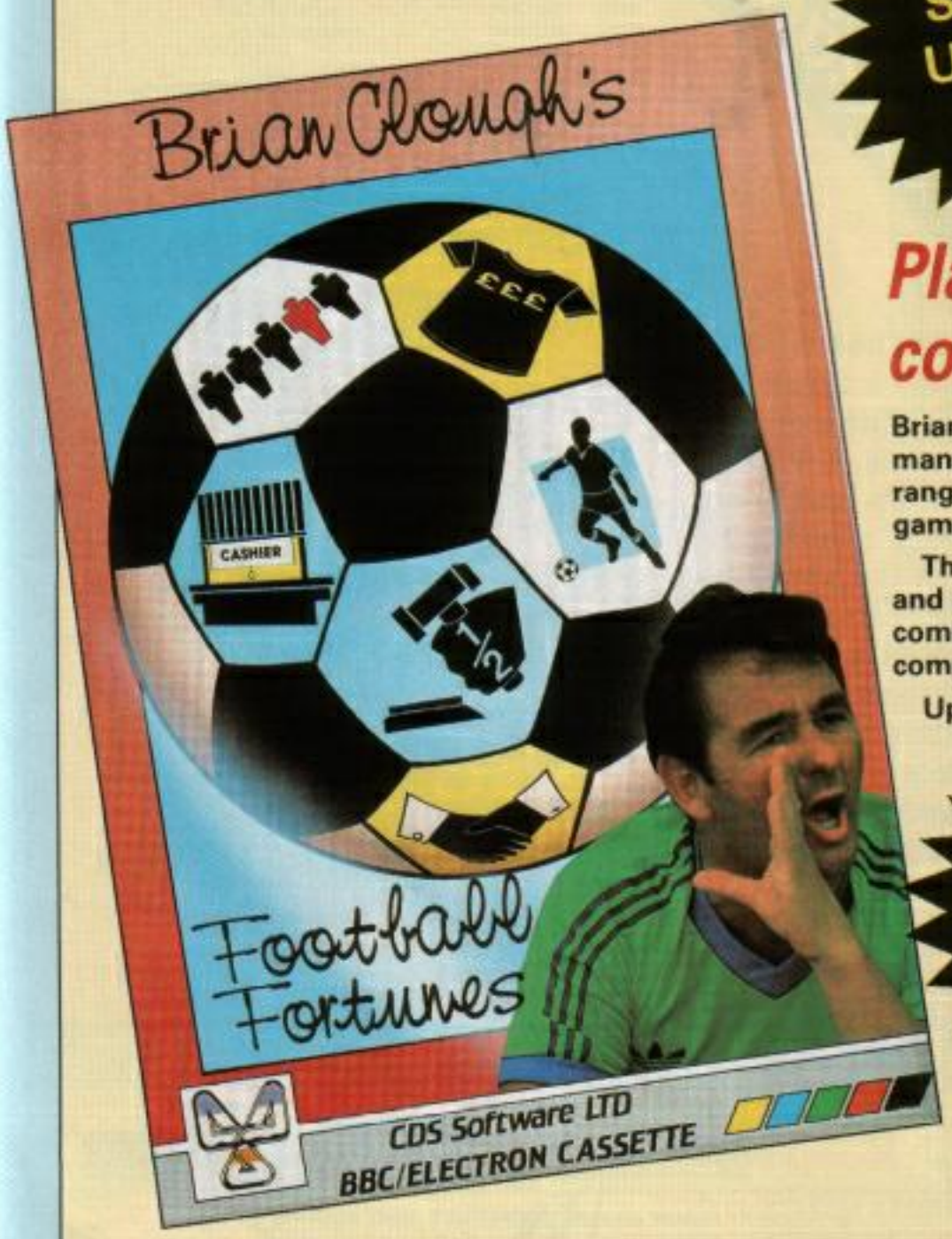

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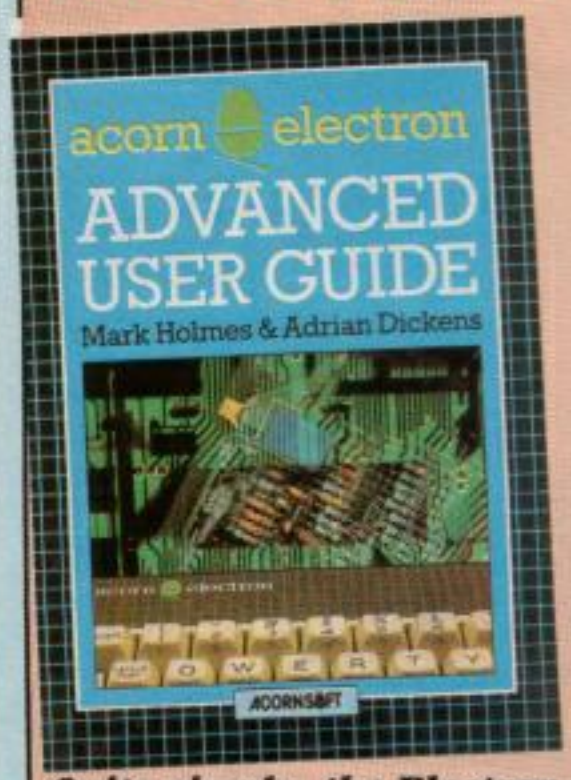

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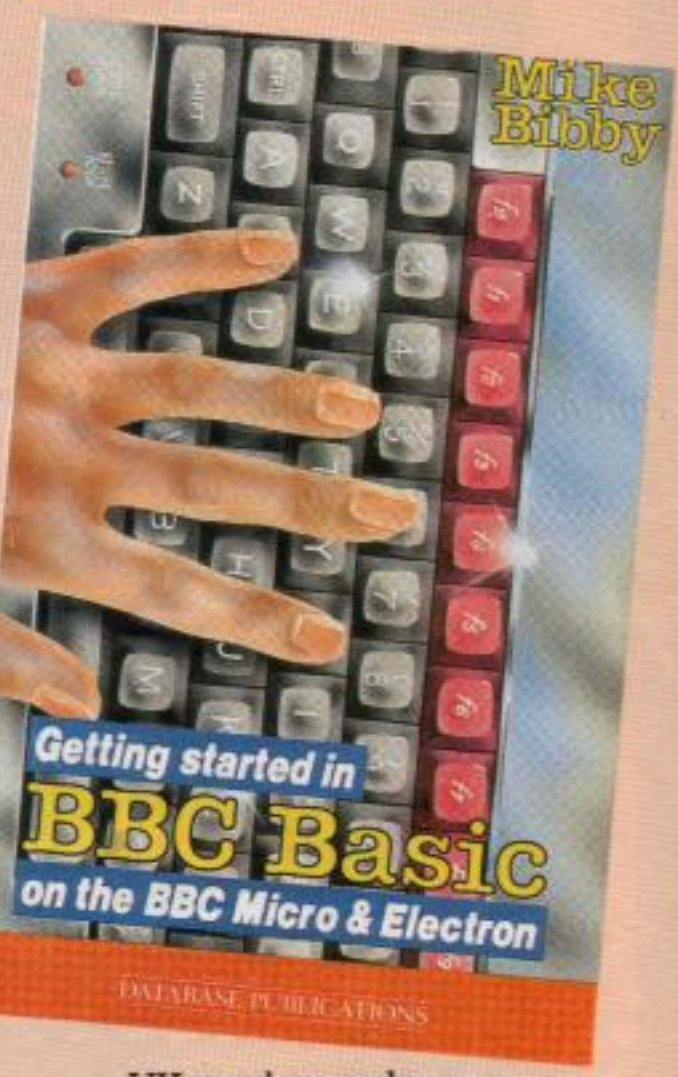

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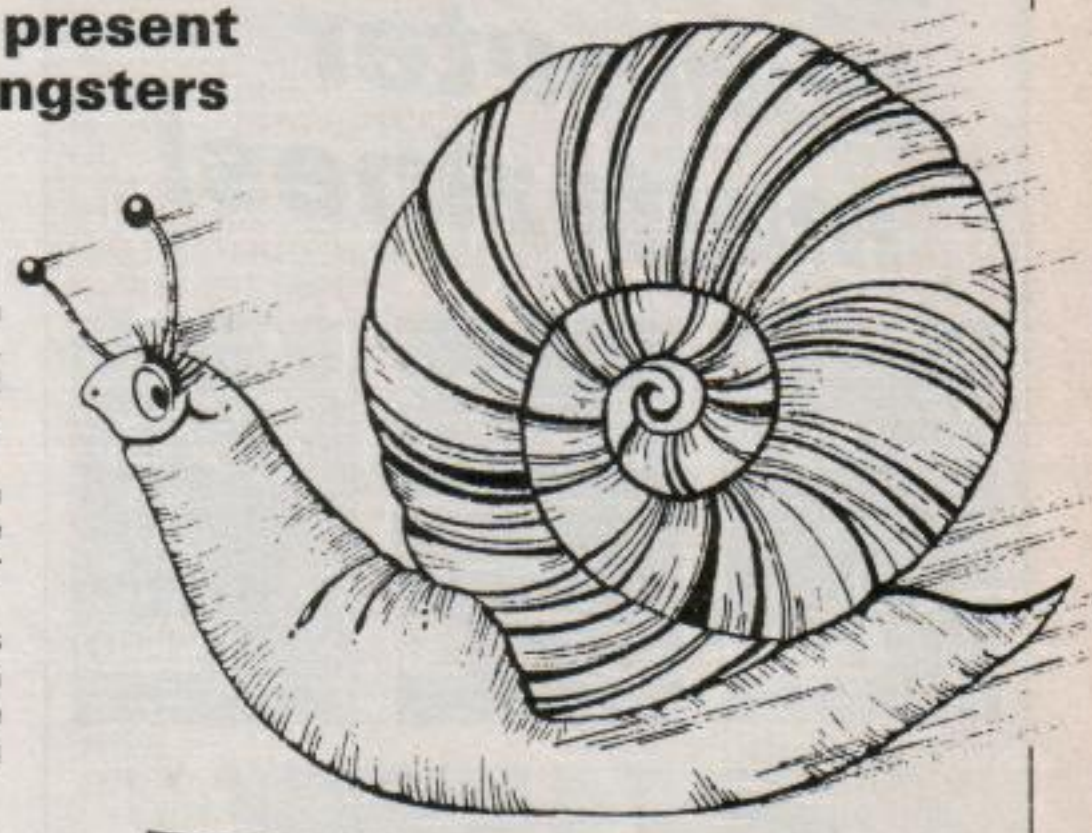


SNAIL trail is a superb educational quiz for children, the object being to help Suzie the snail win a race against her five animal friends – Willie the worm, Belinda the bird, Percy the penguin, Charlie the cat and Desmond the dog.

The farmyard is in uproar as Willie, who is to be the first competitor, slithers up to the starting line.

Farmer Giles raises his gavel and taps three times on the rickety old gate. A hush descends over the expectant crowd as the old man explains the rules.

Five challengers take on Suzie in a test of her knowlege of animals. Each question is multiple choice and the fastest competitor will win the race. Let the contest begin.

Sadly, Suzie isn't very fast so you will have to help. When each question appears, tap the spacebar until the pointer is opposite the answer that you think is right. Press Return to confirm your selection.

If you answer correctly, you will receive a tick and Suzie will move forward. An incorrect answer however, will result in a cross and Suzie's opponent racing ahead.

Don't spend too long on your answer either, because time, and animals, wait for no snail.

Included in the program is the facility to add your own questions. These should be constructed in the following format:

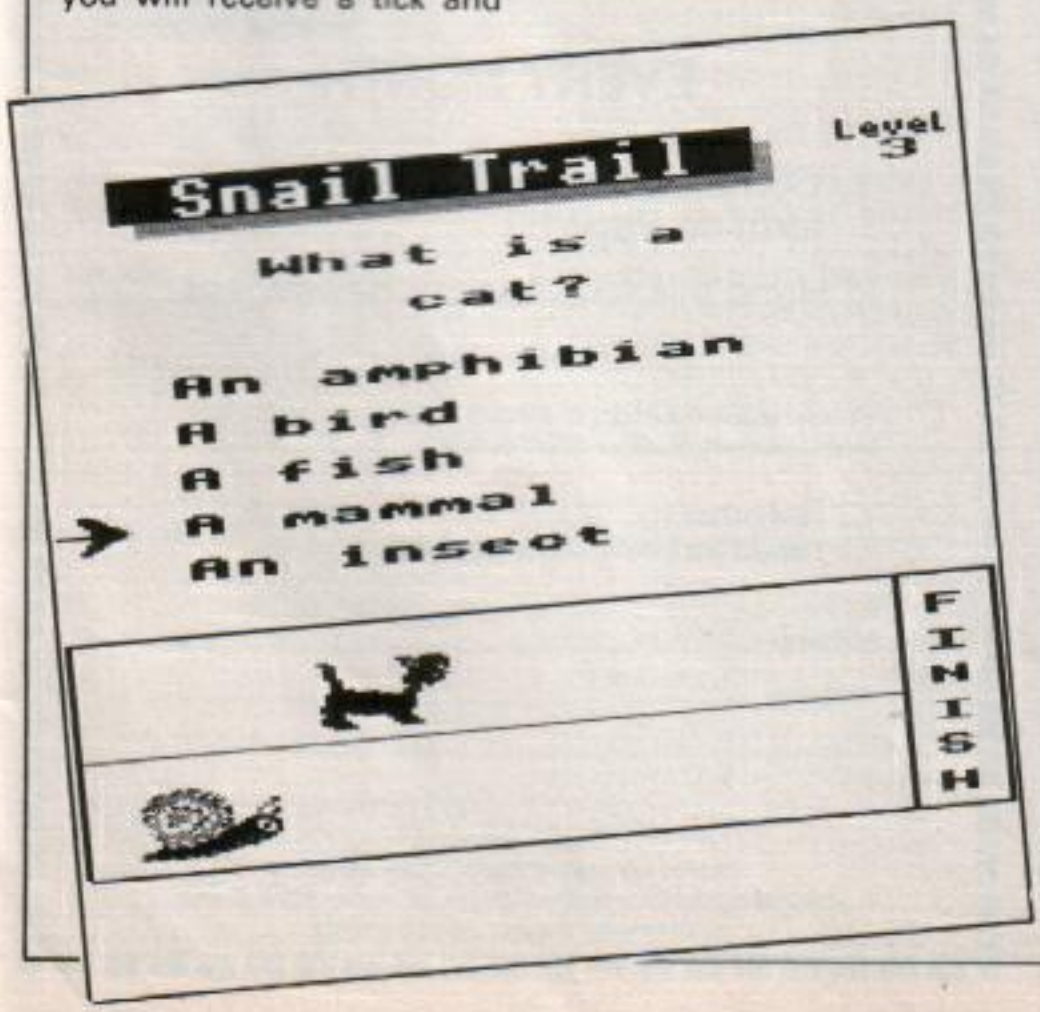
```
1401 DATA Question, Correct
 answer, Up to four incorre
ct answers,"*"
```

For instance:

```
1401 DATA Which of these is
 an omnivore?,A Human being,
A dog, A cat, A hedgehog, A
lion,"*"
```

There is space for 10 lines of data between 1400 and 1409, although the program can be renumbered to recover more space if you wish.

The last line of data must be the word END, as this flags the end of the questions and answers.



PROCEDURES

main	The main loop.
assemble	Assemble machine code.
big()	Print large text.
sprite	Print the sprites.
arrow	Print the pointer.
bench	Set up the screen.

CONTROLS

spacebar	Moves pointer
Return	Confirms answer
Q	Turns the music off
S	Turns music on

VARIABLES

creatures	Number of animals
level%	Current level of play
choice	Number of answer given
answered	True when a question answered
won	True if the snail wins
name$()	The animals' names

```
  10 REM Snail Trail
  20 REM By Stephen Weir
  30 REM and Andrew Weir
  40 REM (c) Electron User
  50 IF PAGE>&E00 GOTO 1420
  60 GOSUB 80
  70 PROCmain
  80 MODE6
  90 in=0:creatures=5
 100 MODE5
 110 code=&900:PROCassemble
 120 *fx11,0
 130 DIMcol%(creatures,2),c
hoice$(6),name$(creatures):R
ESTORE150:FORI%=1TOcreatures
:READname$(I%),col%(I%,1),co
l%(I%,2):NEXT
 140 RETURN
 150 DATAWorm,1,3,Bird,2,3,
Cat,4,6,Penguin,6,3,Dog,1,3
 160 REM Tune data
 170 DATA52,3,48,1,52,4,72,
4,52,4,-1,52,4,44,4,68,8
 180 DATA40,3,36,1,40,4,60,
4,40,4,-1,40,4,32,4,52,8,24,
4,40,4,32,4,44,4,48,4,60,4,5
2,4,-1,52,4,72,2,68,2,60,4,5
2,4,72,4,60,4,68,4,72,4,-9
 190 DEF PROCsprite_data
 200 DIM level 50,snail 146
,arrow 66,animals 146*creatu
res
 210 RESTORE300:PROClocate(
level)
 220 RESTORE320:PROClocate(
snail)
 230 RESTORE360:PROClocate(
arrow)
```

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Snail Trail listing

◀ From Page 55

```
  240 RESTORE390:FORsprites=
1TOcreatures:PROClocate(anim
als+146*(sprites-1)):NEXT
  250 ENDPROC
  260 DEF PROClocate(loc) LO
CALbyte,data,count,offset,x,
y:READx,y:?loc=x:?(loc+1)=y:
loc=loc+2:byte=0:REPEAT READ
data:IFdata>=0byte?loc=data
  270 IFdata=-1READcount,dat
a:FORoffset=1TOcount:byte?lo
c=data:byte=byte+1:NEXT ELSE
 byte=byte+1
  280 UNTILdata=-9:ENDPROC
  290 REM Level
  300 DATA 6,8
  310 DATA -1,8,0,-1,6,34,51
,0,0,0,17,34,51,34,153,0,0,0
,34,170,170,17,153,0,0,0,153
,170,187,34,17,0,34,34,34,17
0,170,34,187,0,-9
  320 REM Snail
  330 DATA 6,24
  340 DATA 0,0,16,3,18,37,67
,5,37,67,5,37,3,1,33,1,16,0,
0,0,16,112,120,90,18,165,15,
15,14,12,41,3,66,7,7,22,66,0
,9,15,15,131,14,131,240,240,
240,180,74,45,13,30,7,3,129,
44,6,10,26,11,36,6,73,11,15,
15,13,52,240
  350 DATA 240,240,90,0,0,12
8,4,74,40,72,30,13,30,5,37,2
8,45,15,26,60,52,240,240,240
,210,105,8,-1,11,0,16,48,112
,-1,5,240,210,120,133,-1,7,0
,18,18,6,12,24,26,194,224,48
,84,84,144,225,104,192,-1,4,
0,-9
  360 REM Arrow
  370 DATA4,16
  380 DATA -1,8,0,51,48,-1,7
,0,16,16,16,-1,4,0,255,240,-
1,4,0,16,16,0,128,192,224,24
0,242,115,115,251,243,115,11
4,240,224,192,128,-1,5,0,128
,192,232,252,232,192,128,-1,
4,0,-9
  390 REM Worm
  400 DATA 6,24
  410 DATA -1,15,0,16,48,48,
112,112,240,210,105,165,-1,7
,0,16,16,48,48,112,112,240,2
40,225,240,210,225,180,194 a
 ca28,-1,6,0,112,-1,6,240,21
0,105,180,193,8,128,-1,12,0,
128,128,192,192,224,240,240,
240,180
  420 DATA 120,165,240,37,82
,48,1,-1,14,0,128,192,194,22
5,180,210,180,210,120,180,12
0,48,-1,15,0,128,224,240,48,
116,176,240,224,192,-9
  430 REM Bird
  440 DATA 6,24
  450 DATA -1,15,0,48,112,24
0,112,-1,15,0,16,48,97,195,1
35,195,225,240,180,180,64,64
,96,112,0,0,0,16,16,16,32,11
2,112,195,150,45,75,135,15,3
0,120,240,112,160,64,64,96,1
12,112,240,240,195,194,225,2
40,240,225
  460 DATA 225,104,120,120,1
20,-1,4,240,224,-1,5,0,128,2
24,224,195,74,225,180,60,120
,112,52,22,150,240,224,192,1
92,128,-1,10,0,8,-1,6,128,-1
,13,0,-9
  470 REM Cat
  480 DATA6,24
  490 DATA 204,-1,5,98,51,-1
,4,49,113,113,115,115,243,24
3,247,119,247,243,243,113,49
,-1,10,0,192,248,-1,4,252,24
8,248,112,16,0,136,136,204,-
1,11,0,192,-1,5,240,252,243,
240,16,0,0,0,112,33,33,16,16
,16,-1,4
  500 DATA 48,16,48,49,241,2
41,243,243,247,238,238,230,2
47,243,115,112,240,123,107,2
41,240,244,229,244,245,162,1
36,136,-1,10,0,136,128,192,1
92,72,64,128,72,128,136,-1,1
5,0,-9
  510 REM Penguin
  520 DATA 6,24
  530 DATA -1,67,0,1,1,3,0,0
,0,1,1,-1,5,3,1,1,3,3,7,7,7,
31,47,47,111,255,127,124,112
,48,12,14,47,127,93,93,127,6
2,30,31,-1,4,63,47,47,110,11
0,238,204,192,224,96,176,-1,
4,0,8,128,192,128,-1,4,0,-1,
5,8,-1,7
  540 DATA 0,-9
  550 REM Dog
  560 DATA 6,24
  570 DATA 82,164,74,132,72,
164,66,37,90,165,90,165,90,1
65,90,164,67,133,75,148,73,1
65,73,36,-1,7,0,240,240,240,
120,180,90,165,90,165,24,8,1
28,8,128,72,128,72,-1,7,0,22
5,240,225,210,165,90,165,90,
165,90,37
  580 DATA 82,37,66,52,66,48
,37,82,33,48,48,48,33,222,16
9,186,221,213,110,183,74,134
,14,44,6,36,96,22,164,18,161
,82,224,230,170,186,165,90,1
65,90,165,74,188,18,-1,10,0,
128,0,0,0,51,123,150,120,180
,104,224
  590 DATA 192,64,128,-1,10,
0,-9
  600 DEF PROCassemble
  610 oswrch=&FFEE:osword=&F
FF1:new=&70:rows=&72:columns
=&73:temp1=&74:place=&76
  620 FORpass=0TO2STEP2:P%=c
ode:[OPTpass
  630 .d STAb:LDA#10:LDX#b A
ND255:LDY#b DIV256:JSRosword
:LDA#0:STAj:.d1 LDA#23:JSRos
wrch:LDAj:ORA#224:JSRoswrch:
LDAj:ASLA:ASLA:TAX:LDY#4:.d2
 INX:LDAb,X:JSRoswrch:JSRosw
rch:DEY:BNEd2:INCj:LDAj
  640 CMP#2:BNEd1:LDX#4:.d3
LDAs,X:JSRoswrch:DEX:BPLd3:R
TS
  650 .sprite LDY#0:LDAplace
:STAnewdata+1:LDAplace+1:STA
newdata+2
  660 .loop1:LDAnew+1:STAtem
p1+1:LDAnew:STAtemp1:LDXrows
:.loop2:.newdata LDA &3000,Y
:EOR(new),Y:STA(new),Y:INCne
wdata+1:BNEp3:INCnewdata+2:.
p3 LDAnew:AND #7:CMP#7:BEQbo
ttom2
  670 INCnew:BNEp4:INCnew+1:
.p4 BNE next2
  680 .bottom2 CLC:LDAnew:AD
C#&39:STAnew:LDAnew+1:ADC#1:
STAnew+1:.next2:DEX:BNE loop
2:LDAtemp1:ADC#8:STAnew:LDAt
emp1+1:ADC#0:STAnew+1:DECcol
umns:BNEloop1:RTS
  690 .b:]:j=b+9:s=j+1:$s=CH
R$11+CHR$225+CHR$8+CHR$10+CH
R$224:NEXT:ENDPROC
  700 ENDPROC
  710 DEF PROCbig(A$) FORCH%
=1TOLENA$:A%=ASCMID$(A$,CH%,
1):CALLd:NEXT:ENDPROC
  720 DEF PROClarge(A$) FORC
H%=1TOLENA$:B$=MID$(A$,CH%):
?&70=ASC B$:A%=10:X%=&70:Y%=
0:CALL &FFF1:VDU23,250,?&71,
?&71,?&71,?&71,?&72,?&72,?&7
2,?&72,23,251,?&73,?&73,?&73
,?&73,?&74,?&74,?&74,?&74
  730 VDU23,252,?&75,?&75,?&
75,?&75,?&76,?&76,?&76,?&76,
23,253,?&77,?&77,?&77,?&77,?
&78,?&78,?&78,?&78:FORI%=1TO
4:VDU249+I%:IFI%<4 VDU8,10
  740 NEXT:VDU11,11,11:NEXT:
ENDPROC
  750 DEF PROCmain
  760 REPEAT PROCinstruction
s
  770 PROCbench
  780 level%=0:REPEATlevel%=
level%+1
```

This is one of hundreds of programs now available FREE for downloading on

MicroLink

In addition to these many BBC Micro programs will also run on the Electron.

```
  790 PROCsetup
  800 REPEAT
  810 IFanswered%PROCprint
  820 KEY%=INKEY(1):IFKEY%=3
2 PROCarrow(select%):select%
=select%+1:IFselect%>choices
% select%=1
  830 IFKEY%=32 SOUND1,-8,25
5,1:PROCarrow(select%):*fx15
  840 IFKEY%=13ANDselect%=co
rrect%right%=right%+1:answer
ed%=-1:GCOL3,3:MOVE1000,500:
DRAW1100,460:DRAW1180,700:RE
STORE170:FORI%=1TO9:PROCnote
(1.5):NEXT:PROCwait(7)
  850 IFKEY%=13ANDselect%<>c
orrect%right%=right%-1:GCOL3
,3:PROCcross:RESTORE180:FORI
%=1TO9:PROCnote(3):NEXT:PROC
cross:*fx21
  860 IF INSTR("Qq",CHR$KEY%
) THEN *fx210,1
  870 IF INSTR("Ss",CHR$KEY%
) THEN *fx210,0
  880 IFRND(1000)<right%*10
PROCsnail
  890 IFRND(1000)<level%*10
AND NOTwon PROCopponent
  900 UNTIL lost OR won OR K
EY%=27
  910 IFwon PROCclear:COLOUR
3:PRINTTAB(5,4);:PROClarge("
Well done!"):PRINTTAB((20-LE
Nname$(level%))DIV2,15);:PRO
Cbig(name$(level%)):COLOUR2:
PRINTTAB(0,10);:PROCbig("You
 have beaten the"):RESTORE17
0:FORI%=1TO35:PROCnote(1.5):
NEXT:PROCwait(6)
  920 IFlost PROCclear:COLOU
R3:PRINTTAB(6,4);:PROClarge(
"Bad luck!"):PRINTTAB((20-LE
Nname$(level%))DIV2,15);:PRO
Cbig(name$(level%)):COLOUR2:
PRINTTAB(1,10);:PROCbig("You
 have lost to a"):RESTORE170
:FORI%=1TO35:PROCnote(3):NEX
T:PROCwait(7)
  930 PROCsprite(snail,snail
%):PROCcreature(level%,creat
ure%)
  940 answered%=-1:UNTILleve
l%=creatures OR lost OR KEY%
=27
  950 UNTIL0
  960 DEF PROCbench VDU22,5,
5,23;8202;0;0;0;:GCOL0,1:PRO
Cbox(170,940,1010,1000,-1):G
COL0,2:PROCbox(140,960,990,1
030,-1):GCOL0,0:MOVE220,1016
:PROCbig("Snail Trail")
  970 GCOL0,3:PROCbox(30,40,
1250,374,0):MOVE1120,374:DRA
W1120,40:MOVE30,207:DRAW1120
,207:A$="FINISH":GCOL0,2:FOR
I%=1TO6:MOVE1152,(6-I%)*50+9
0:PRINTMID$(A$,I%,1):NEXT
  980 PROCsprite(level,&5908
):VDU4
  990 level%=1:answered%=-1
 1000 DEF PROCcross MOVE1000
,500:DRAW1190,650:MOVE1190,5
00:DRAW980,640:ENDPROC
 1010 DEF PROCwait(t) FORI%=
1TOt*1000:NEXT:ENDPROC
 1020 DEF PROCsprite(stored,
screen) !new=screen:!place=s
tored+2:?rows=?(stored+1):?c
olumns=?stored:CALLsprite:EN
DPROC
 1030 DEFPROCbox(x1,y1,x2,y2
,fill) MOVEx1,y1:IF fill MOV
Ex2,y1:PLOT85,x1,y2:PLOT85,x
2,y2 ELSE DRAWx1,y2:DRAWx2,y
2:DRAWx2,y1:DRAWx1,y1
 1040 ENDPROC
 1050 DEF PROCsetup VDU19,1,
col%(level%,1);0;19,2,col%(l
evel%,2);0;:snail%=&79D0:cre
ature%=&7390:PROCsprite(snai
l,snail%):PROCcreature(level
%,creature%):COLOUR2:PRINTTA
B(18,1);level%:lost=0:won=0:
right%=0:ENDPROC
 1060 DEF PROCcreature(level
%,screen) PROCsprite(animals
+146*(level%-1),screen):ENDP
ROC
 1070 DEF PROCsnail PROCspri
te(snail,snail%):snail%=snai
l%+8:PROCsprite(snail,snail%
):SOUND0,-5,7,2:IFsnail%=&7A
A8 THEN won=-1
 1080 ENDPROC
 1090 DEF PROCopponent PROCc
reature(level%,creature%):cr
eature%=creature%+8:PROCcrea
ture(level%,creature%):SOUND
0,-5,5,2:IFcreature%=&7468 l
ost=-1
 1100 ENDPROC
 1110 DEF PROCclear VDU28,0,
18,19,4,12,26:ENDPROC
 1120 DEF PROCprint PROCclea
```

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Snail Trail listing

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```
r:RESTORE1320:LOCALcount:FOR
count=1TORND(50):PROCread:IF
 end% RESTORE1320:count=coun
t-1
 1130 NEXT:correct%=1:FORI%=
1TORND(20):A%=RND(choices%):
B%=RND(choices%):d$=choice$(
A%):choice$(A%)=choice$(B%):
choice$(B%)=d$:IFA%=correct%
 correct%=B%ELSEIFB%=correct
% correct%=A%
 1140 NEXT
 1150 a%=21:REPEAT pos%=INST
R(question$," ",a%):IF pos%<
=21ANDpos%>0 chop%=pos% ELSE
 a%=a%-1
 1160 UNTILpos%<=21ANDpos%>0
:q1$=+LEFT$(question$,chop%-
1):q2$=RIGHT$(question$,LENq
uestion$-chop%+1)
 1170 COLOUR2:PROCcen(q1$,4)
:PROCcen(q2$,6):COLOUR3:FORI
%=1TOchoices%:PRINTTAB(3,9+(
I%-1)*2);choice$(I%):NEXT:se
lect%=1:PROCarrow(select%)
 1180 answered%=0:ENDPROC
 1190 DEF PROCcen(A$,Y%) PRI
NTTAB((20-LENA$)DIV2,Y%);A$;
:ENDPROC
 1200 DEF PROCarrow(x%) PROC
sprite(arrow,(x%*2+6)*&140+&
5804):ENDPROC
 1210 DEF PROCread READquest
ion$:IFquestion$="END"end%=-
1:ENDPROC ELSE end%=0:I%=0:R
EPEAT I%=I%+1:READchoice$(I%
):UNTILchoice$(I%)="*":I%=I%
-1:choices%=I%
 1220 ENDPROC
 1230 DEF PROCnote(tempo) RE
ADp%:IFp%=-1SOUND1,0,0,1 ELS
E IFp%=-9 RESTORE170:SOUND1,
0,0,4*tempo ELSE READd%:SOUN
D1,-8,p%+46,d%*tempo
 1240 ENDPROC
 1250 DEF PROCinstructions V
DU22,4,23;8202;0;0;0;
 1260 PRINTTAB(14,1);:PROCla
rge("SNAIL TRAIL")
 1270 PRINTTAB(0,7);"Help Su
zie Snail race against her"
"farmyard friends by answer
ing questions""about anima
ls.""""To answer a questio
n, move the arrow""until i
t sits beside the answer you
""think is best."""
 1280 PRINT"To move the arro
w use the ";:COLOUR129:COLOU
R0:PRINT"spacebar";:COLOUR1:
COLOUR128:PRINT"."""When yo
u have done this, press ";:C
OLOUR129:COLOUR0:PRINT"retur
n";:COLOUR128:COLOUR1:PRINT"
."
 1290 IF NOTin PROCsprite_da
ta:in=-1
 1300 *fx21
 1310 PRINTTAB(10,30);:PROCb
ig("Press the "):COLOUR129:C
OLOUR0:PROCbig("spacebar"):R
EPEATUNTILGET=32:ENDPROC
 1320 DATA Who blew the hous
e in?,The Big Bad Wolf,Red R
iding Hood,Puff the Dragon,R
oland Waddilove,Wizard of Oz
,*,How does a dolphin see
at night?,sonar,electric eye
s,400w bulbs,it can't,*
 1330 DATA How many legs doe
s an insect have?,Six,Two,Fo
ur,Eight,Thousands,*,Which
 of these birds is flightles
s?,Penguin,Magpie,Pigeon,Bla
ckbird,*
 1340 DATA How many legs doe
s an Octopus have?,Eight,Six
,Ten,Twelve,*,What is a ca
t?,A mammal,A fish,An amphib
ian,A bird,An insect,*
 1350 DATA Where does a griz
zly bear sleep?,In a den,In
a house,On a nest,Up a tree,
*,What does a seagull have
 for breakfast?,Fish,Cornfla
kes,Fried eggs,Pork,Potatoes
,*
 1360 DATA Where do alligato
rs hold their young?,In thei
r mouths,On their back,In a
pouch,*,Which animal can g
row a saddle?,A worm,A fish,
A bird,A horse,*
 1370 DATA What does a drago
n fly breath?,Air,Fire,Water
,*,What country do Kiwis c
ome from?,New Zealand,Englan
d,Ireland,America,Spain,*
 1380 DATA How do ants "talk
" to each other?,Using anten
nae,With their mouth,Sign la
nguage,A dance,*,How do be
es talk to each other?,A dan
ce,Using antennae,With their
 mouth,Hearing aids,*
 1390 DATA Which of these is
 not a type of ant?,Navigati
on ant,Soldier ant,Nurse ant
,Worker ant,Queen ant,*,Wh
en will a dead frog kick its
 leg?,Electrical shock,Gets
a fright,During cremation,At
 the funeral,*
 1400 REM add extra question
s here
 1410 DATA END
 1420 *KEY 0 *T.|MD%=PAGE-&E
00:FOR I%=PAGE TO TOP STEP4:
!(I%-D%)=!I%:NEXT|MPAGE=&E00
|MOLD|MRUN|M
 1430 *FX 138,0,128
```

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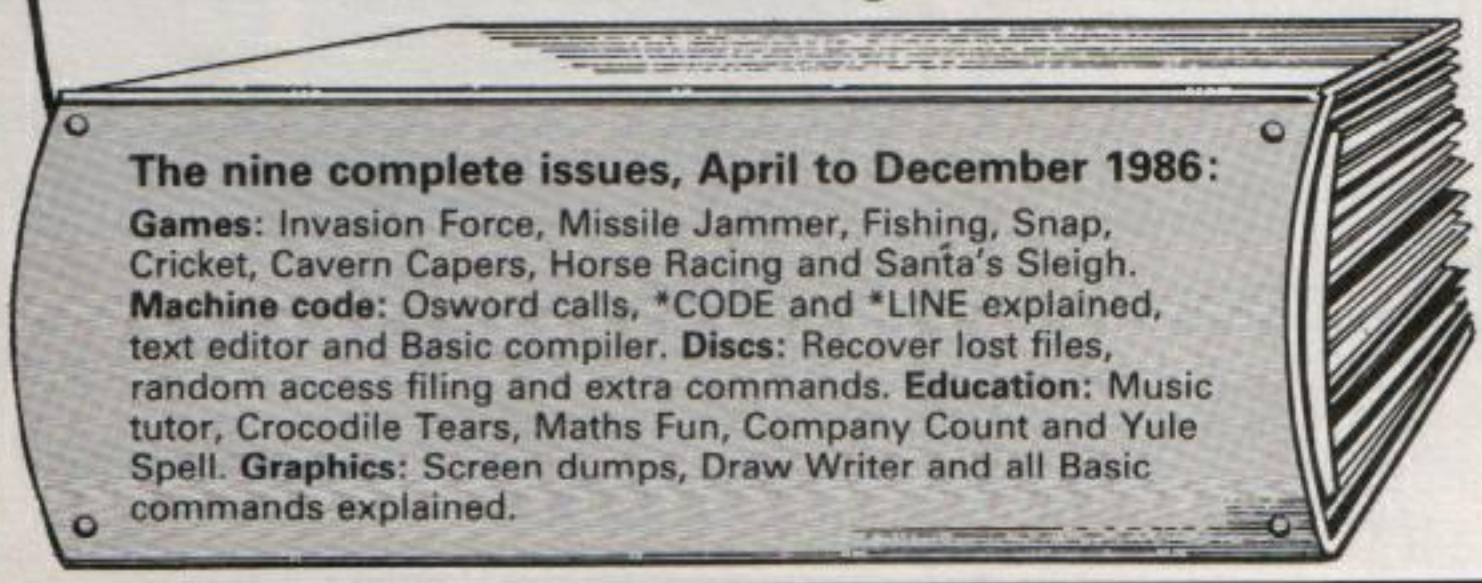

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TO ORDER TURN TO THE FORM ON PAGE 53

COMPUTERSPEAK EXPLAINED

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It is strange how straightforward words and phrases take on a completely different meaning when used in a computing context. So we have compiled this easy-to-read guide to computer jargon for the novice:

NOVICE ELECTRON OWNER

●*"Compatible with all Electron add-ons"* – Will not work with your computer unless you know more about interfacing than we do.

●*"Standard"* – We don't know enough about other interfaces to know why it won't work with yours.

●*"Universal standard"* – We have tried it out on a BBC Micro.

●*"Industry standard"* – We copied the design from someone else, and they say it works.

●*"Guaranteed delivery within 21 days"* – A universal constant, as whenever you ask the question, delivery will always be within 21 days.

●*"Delivery will be at the end of the month"* – Another way of stating the universal constant, for the innumerate.

●*"In stock"* – We have ordered it from the manufacturers.

●*"Now in stock"* – When the closing date for the advertisement was reached three weeks ago, we were promised delivery inside a fortnight.

●*"Tomorrow's technology, today"* – It arrived here a day early.

●*"Obsolete"* – We've had it in stock for more than a week.

●*"Will be available shortly"* – We haven't actually made one yet, but can forsee no problems.

●*"Will be available later in the year"* – We discovered a few problems.

●*"Will be available sometime next year"* – We lost the blueprints.

●*"Easily expandable"* – There are a lot of sockets on it, but we don't know what to do with them.

●*"Uses your own TV as a display"* – Sometimes you may actually be able to read what is on the display as well.

●*"Operating system"* – Something we sell you every six months or whenever you find the bugs in the last one we sold you.

●*"The applications are only limited by your own imagination"* – We can't think of anything useful it can do.

●*"The program can easily be modified to run on other versions of the Electron or BBC Micro"* – Sometimes seen at the end of articles and is a disclaimer for any intelligence the author might have falsely indicated to the reader.

●*"Programs can be saved on to any domestic tape recorder"* – This is any recorder except the one you actually own at the moment.

●*"User friendly"* – You are asked for every little option and parameter to see if it needs to be included. This will take at least 10 minutes and you will have to go through the whole lot again if you want to change something.

●*"A must for every Electron user"* – It's nothing new and we couldn't think of anything original to say about it.

●*"Buy now at specially discounted prices"* – The product is about to be discontinued.

●*"Powerful"* – It's so good, even we can't understand it.

●*"Advanced"* – So complex, even the programmer can't understand it.

●*"Easy to use"* – The average postgraduate of computer science should experience no difficulty.

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Feature

◀ From Page 59

●*"Comprehensive documentation"* – Roughly photocopied bundle of misspelt typescript masquerading as a manual.

●*"Extensive documentation"* – Large, poetically written tome of no technical use whatsoever.

●*"Bug"* – A feature not included in the documentation.

●*"Feature"* – A documented bug.

●*"Ram"* – Unintelligent, male herbivorous quadrupedal mammal.

●*"Massive ram"* – Mean looking beast, approach with extreme care.

●*"Rom"* – An illiterate ram.

●*"WYSIWYG"* – What you see is what you get. We don't supply the plug, the cassette lead, the instructions...

●*"WIMP"* – Any computer literate person of non-Electron persuasion.

●*"Mouse"* – Small, incredibly cute, but odiferous rodent.

●*"Disclaimer"* – We do not accept there are any bugs in this software preventing it from doing its job.

●*"Software"* – A jumper produced from the output of Database Software's Knitwear Designer program.

●*"Hardware"* – Software made from steel wool.

●*"Firmware"* – Another name for hardware.

●*"Shadow ram"* – memory chips that work in the dark.

●*"Second processor"* – The first one we sold you doesn't actually enable you to do anything useful, for that you'll need a new one.

●*"Fred, Jim and Sheila"* – The three people who designed the Electron.

●*"Plus 1"* – Contains all the bits they forgot to include in the Electron.

●*"Plus 3"* – Contains all the bits they forgot to include in the Plus 1.

●*"Turbo driver"* – An Electron user with go-faster stripes on his micro.

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CODENAME: DROID

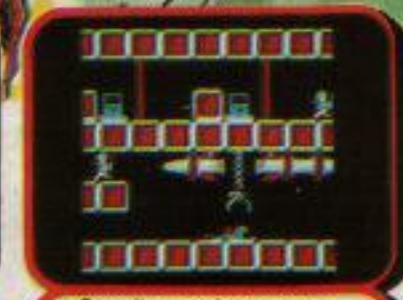
Stryker's Run - Part 2

The Dramatic Loading Screen

Climbing up a rope (SURFACE DEFENCE)

Flying with a jet-pack (ANCIENT SHRINE)

The elusive "Herbert" Droid (CREW'S QUARTERS)



Crawling under a crane (MISSILE FACTORY)

Commander John Stryker is back in CODENAME: DROID

Stryker's Run was one of our most successful releases of 1986. It stayed at the top of the BBC Micro software charts for six weeks and received several glowing reviews: "The graphics are stunning . . . This should be in every collection" enthused A & B Computing.

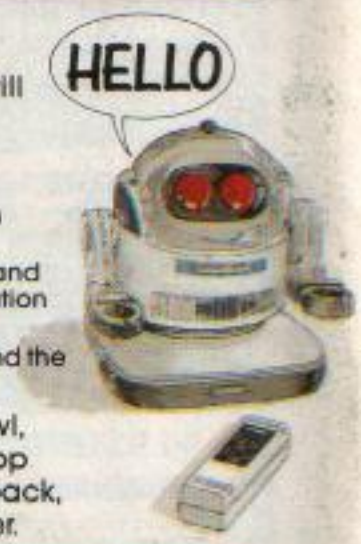
Now CODENAME: DROID presents a new challenge for Commander John Stryker. He has been commissioned by the Allied Nations to undertake another perilous mission in their continuing struggle against the warmongering Volgans.

His task is to locate and seize the Volgans' latest weapon: a new spacecraft (codenamed the Z11) which is equipped with the revolutionary matter/anti-matter warp drive facility. Stryker must land on the mysterious planet Volga, penetrate the Volgans' underground defence systems, find the spacecraft and requisition it.

As Stryker descends below the planetary surface, he will pass through 4 different zones of Volgan activity:-

- The Surface Defence — an array of steel girders, ropes and chains lies coldly between the crusted white rock walls.
- The Ancient Shrine — a stone-walled temple bedecked with hideous gargoyles and rusting chandeliers.
- The Crew's Quarters — the Volgans' relaxation area: tables and chairs are arranged invitingly amongst the essential ventilation pipes.
- The Missile Factory — clinical psuedo-metallic walls surround the missiles, bombs, and computers of the evil Volgan race.

Your character in the game can jump, run, kneel, crawl, climb up and down ropes, fire his laser blaster and drop mines. He can also fly for short distances using his jet-pack, and access information via his wrist terminal computer.



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The screen pictures show the BBC Micro version of the game. The graphics of the Acorn Electron version are indentical.

Prize Competition

If you complete the entire CODENAME: DROID mission, you can enter our competition.
Prizes include 1 talking remote-controlled robot, 5 small remote-controlled robots, £150 in cash, and competition certificates.
Closing Date: 29th February, 1988.

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PALACE of MAGIC

Leaping over deadly swords and spikes

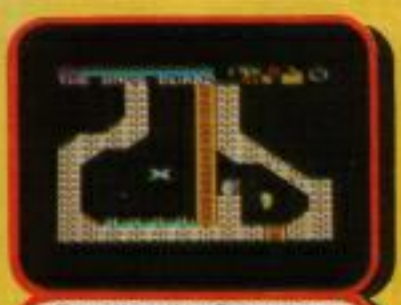
Climbing up the East Tower

Wandering through a patch of woodland

Approaching the meandering river

At the top of the West Tower

Exploring the passages



Greeting the Guardian of the Guards

Down in the dungeons

Over 100 Screens full of Challenging Puzzles and Awesome Foes

By practising acts of benevolence and goodwill, you have offended the evil wizard Caldeti. Summoning forth his satanic powers in order to extract retribution, he has cast two powerful spells upon you: (1) you have been reduced to the size of a dwarf; (2) Caldeti has banished you to one of his old homes, the "Palace of Magic".

The palace and its surrounding land is littered with magical objects and mysterious creatures. It is rumoured that there is also a hidden transporter — your only means of escape from this enchanted place.

After exploring the rooms of the palace, you should venture forth through the enclosing woodland: towards the ancient church and the eerie dungeons, or through the maze of secret passages, or over the river to the princess's house.

On your journeys, you will encounter many strange animals and people including rock monsters, gremlins, imps and guards. Some are good and some are evil. You will need to decide who you can trust to help you in this arduous quest.

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(Compatible with the BBC B, B+ and Master Series computers).

PRIZE COMPETITION

The first prize in our competition is a treasure chest containing over £200 worth of mystical and magical artefacts. 10 runners-up will each receive £5 and a signed certificate.
To enter the competition, you must complete the "Palace of Magic" adventure, and note down the congratulatory message you receive.
Closing Date: 30th April, 1988.

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